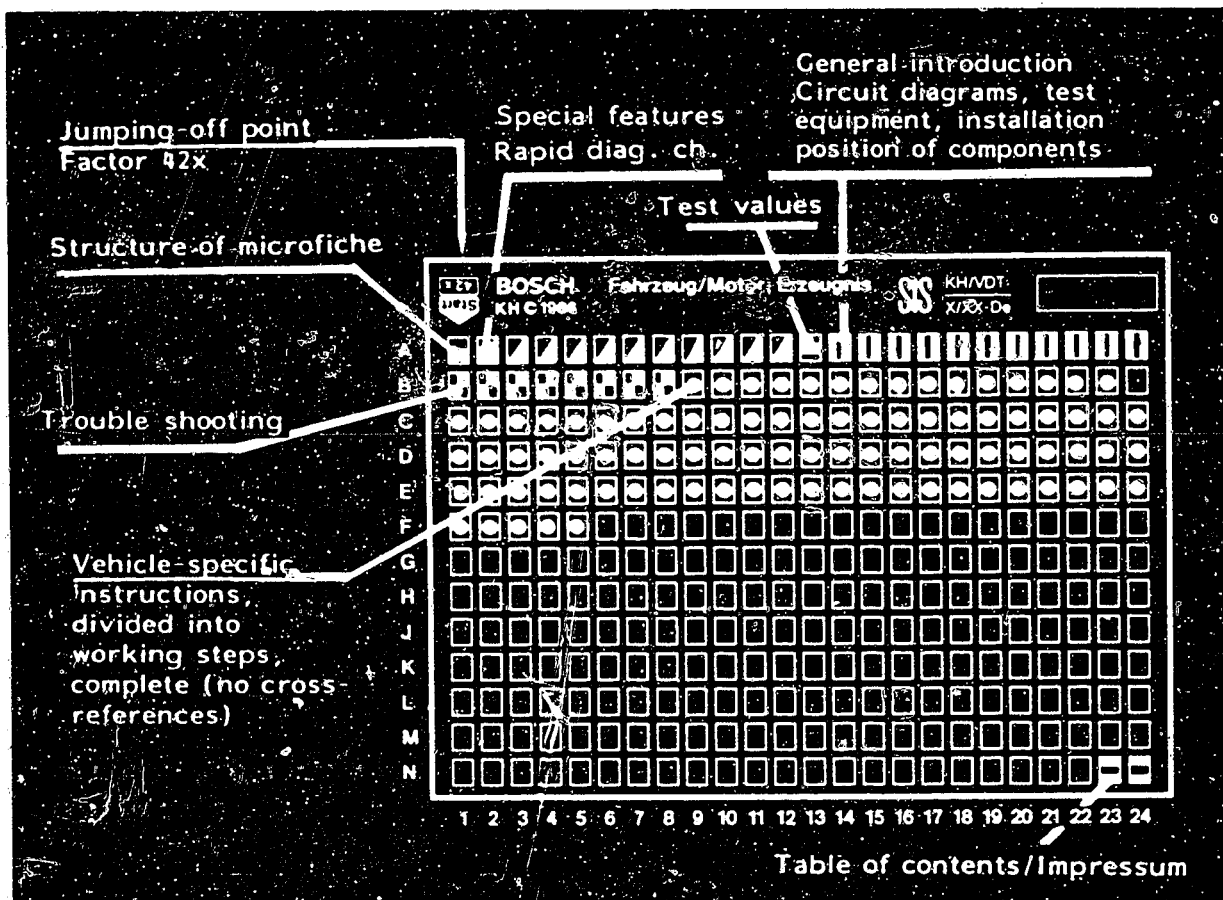


Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

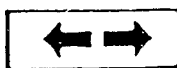
E16	Product/component/test step
	Vehicle/engine

Coordinate

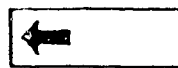
3. Limits of section



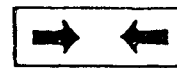
Beginning



Mid-section



End



One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

C6

A1	Trouble-shooting program	
-----------	--------------------------	--

1. Special features

Microcard for digital, electronic transmission control in the BMW models of series 6 and 7 Automatic (as of 9.83) and 745i (3.4l Turbo) as of 5.83.

- The control unit forms one functional unit with the Motronic and uses a microprocessor as well as the engine sensors for both systems jointly.
- Separate microcards have been prepared for the Motronic and the knock control (745i only).
- Sweden/Switzerland version (635CSi, 735i and 745i; as of 9.84) as well as Japan version (745i; as of 10.84) are included.
- This microcard replaces BMW 00/E 121.

2. Rapid Diagnosis chart for universal test adapter

The following rapid diagnosis chart makes it possible for the expert to quickly check the electrical part of the system using the universal test adapter.









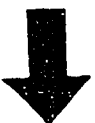
The rapid diagnosis chart contains the following information:

- Switch positions on universal test adapter
- Sequence of test steps
- Notes on how to operate the universal test adapter or other components.
- Readings on multimeter and motortester
- References to coordinates of the respective detailed testing and trouble-shooting program.

If detailed information and instructions are required, always proceed according to the trouble-shooting program starting on Coordinate B 1.



Rapid diagnosis chart for universal test adapter

Test step	Switch position		Remarks	Test specifications (reading)	For trouble-shooting see Coordinate
	V	Ω			
1		1	Selector switch in position "P". Ignition off. Disconnect control unit. Measure insulation resistance of speed sensor shielding. Term. 23 to Term. 22 (ground).	<u>greater than 100 kΩ</u>	B 16
2		2	Measure insulation resistance of speed sensor. Term. 8 to Term. 22	<u>greater than 100 kΩ</u>	B 18
3		3	Measure insulation resistance between shielding and speed sensor lead. Term. 23 to Term. 27.	<u>greater than 100 kΩ</u>	B 20
4		4	Measure winding resistance of speed sensor. Term. 8 to Term. 27.	<u>0.7 ... 1.8 kΩ</u>	B 22
5		5	Measure shunt resistance of kick-down switch. Term. 3 to Term. 22. Do not operate accelerator.	<u>greater than 100 kΩ</u>	C 1
6		11	Measure insulation resistance of solenoid-operated valves and of pressure regulator in transmission. Term. 18 to Term. 22.	<u>greater than 100 kΩ</u>	C 3
7		12	Program switch of vehicle in position "S". Measure insulation resistance of program switch. Term. 4 to Term. 22.	<u>greater than 100 kΩ</u>	C 5
8		13	General: Lead from Term. 35 to Term. 22 (ground) With 745i: Internal resistance of knock control unit.	General: <u>less than 10Ω</u> 745i: <u>1 ... 9 kΩ</u>	C 7
9		14	Program switch in position "E". Measure resistance. Term. 4 to Term. 22.	<u>less than 10 Ω</u>	C 9

A3

Rapid diagnosis chart
Electronic transmission control BMW









A4

Rapid diagnosis chart
Electronic transmission control BMW



Rapid diagnosis chart for universal test adapter (continued)

Test step	Switch position		Remarks	Test specification (reading)	For trouble-shooting see Coordinate
	V	Ω			
10		15	Depress accelerator as far as it will go. Measure resistance of kick-down switch. Term. 3 to Term. 22.	<u>Less than 10 Ω</u>	C 11
11		16	Measure winding resistance of solenoid-operated valve MV 1. Term. 5 to Term. 18	<u>25 ... 65 Ω</u>	C 13
12		17	Measure winding resistance of solenoid-operated valve MV 2. Term. 6 to Term. 18.	<u>25 ... 65 Ω</u>	C 15
13		18	Measure winding resistance of solenoid-operated valve for reverse gear lock. Term. 7 to Term. 18.	<u>25 ... 65 Ω</u>	C 17
14		19	Measure winding resistance of solenoid-operated valve for converter clutch. Term. 17 to Term. 18.	<u>25 ... 65 Ω</u>	C 19
15		20	Measure winding resistance of pressure regulator. Term. 2 to Term. 18.	<u>4.5 ... 9 Ω</u>	C 21
16	3	20	Measure supply voltage 1 for transmission control. Term. 10 to Term. 22. Relay and warning lamp for transmission control. Switch on ignition.	<u>10 ... 15 V</u> Warning lamp for transmission control comes on.	C 23
17	4	20	Measure supply voltage 2 for transmission control. Term. 18 to Term. 22.	Press button 3 <u>10 ... 15 V</u> Warning lamp for transmission control goes out.	D 1
18	5	20	Selector switch in position 1. Measure voltage. Term. 12 to Term. 22.	<u>Greater than 6 V</u>	D 3

A5

Rapid diagnosis chart

Electronic transmission control BMW



A6

Rapid diagnosis chart

Electronic transmission control BMW



Rapid diagnosis chart for universal test adapter (continued)

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specifications (reading)</u>	<u>For trouble-shooting see Coordinate</u>
	V	Ω			
19	5	20	Selector switch in position 2. Measure voltage. Term. 12 to Term. 22.	<u>less than 1 V</u>	D 5
20	6	20	Selector switch in position 2. Measure voltage. Term. 13 to Term. 22	<u>greater than 6 V</u>	D 7
21	6	20	Selector switch in position 3. Measure voltage. Term. 13 to Term. 22.	<u>less than 1 V</u>	D 9
22	7	20	Selector switch in position 3. Measure voltage. Term. 28 to Term. 22.	<u>greater than 6 V</u>	D 11
23	7	20	Selector switch in position D. Measure voltage. Term. 28 to Term. 22.	<u>less than 1 V</u>	D 13
24	8	20	Selector switch in position D. Measure voltage. Term. 29 to Term. 22.	<u>greater than 6 V</u>	D 15
25	8	20	Selector switch in position N. Measure voltage. Term. 29 to Term. 22.	<u>less than 1 V</u>	D 17
26	9	20	Selector switch in position N. Measure voltage. Term. 30 to Term. 22.	<u>greater than 6 V</u>	D 19
27	9	20	Selector switch in position R. Measure voltage. Term. 30 to Term. 22.	<u>less than 1 V</u>	D 21
28	9	20	Selector switch in position P. Measure voltage. Term. 30 to Term. 22.	<u>less than 1 V</u>	D 23
29	10	20	Program switch in position E. Measure voltage. Term. 34 to Term. 22.	<u>greater than 4 V</u>	E 1
30	10	20	Program switch in position 3·2·1. Measure voltage. Term. 34 to Term. 22.	<u>less than 0.8 V</u>	E 3

A7

Rapid diagnosis chart

Electronic transmission control BMW



A8

Rapid diagnosis chart

Electronic transmission control BMW



Rapid diagnosis chart for universal test adapter (continued)

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specification (reading)</u>	<u>For trouble-shooting see Coordinate</u>
	V	Ω			
31	11	20	Connect sockets 1 and 2 with a lead or with the ammeter (1.5 A). Selector switch in position N. Connect control unit. Let engine idle. Set program switch to position S. Measure voltage (Term. 17 to Term. 22). Follow the sequence of operations.	10 ... 15 V	E 5
32	12	20	As test step 31, but Term. 7 to Term. 22.	10 ... 15 V	E 7
33	13	20	As test step 31, but measure Term. 5 to Term. 22.	less than 1 V	E 9
34	14	20	As test step 31, but measure Term. 6 to Term. 22.	less than 1 V	E 11
35	15	20	Drive vehicle onto chassis dynamometer. Program switch in position S. Selector switch in position D. Raise driving speed without load slowly to approx. 20 km/h. Term. 7 to Term. 22.	less than 1 V at approx. 20 km/h	E 13
36	16	20	As test step 35, but driving speed approx. 40 km/h. Term. 5 to Term. 22.	10 ... 15 V at approx. 40 km/h	E 15
37	17	20	As test step 35, but driving speed approx. 80 km/h. Term. 6 to Term. 22.	10 ... 15 V at approx. 80 km/h	E 17
38	18	20	As test step 35, but driving speed approx. 100 km/h. Approach 100 km/h very slowly. Term. 17 to Term. 22.	less than 1 V at approx. 100 km/h	E 19

A9

Rapid diagnosis chart
Electronic transmission control BMW



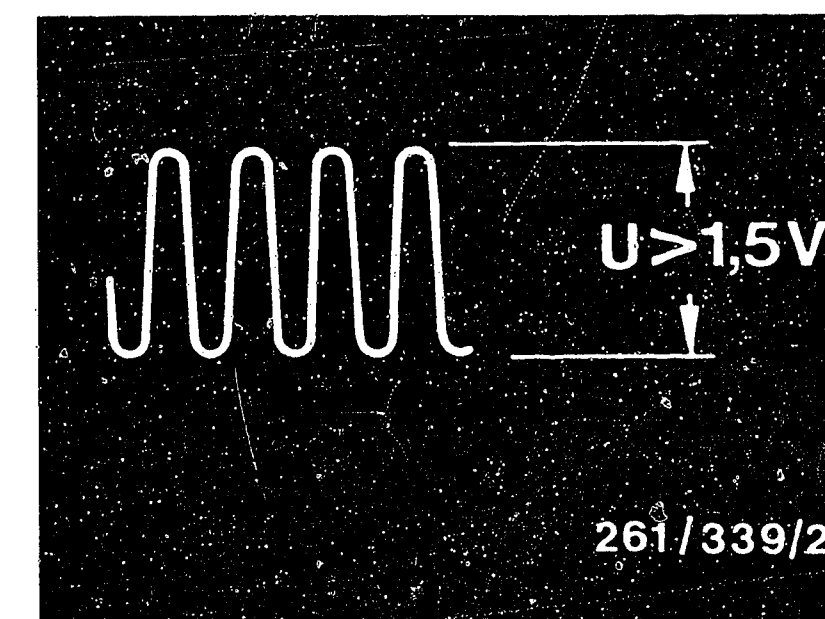
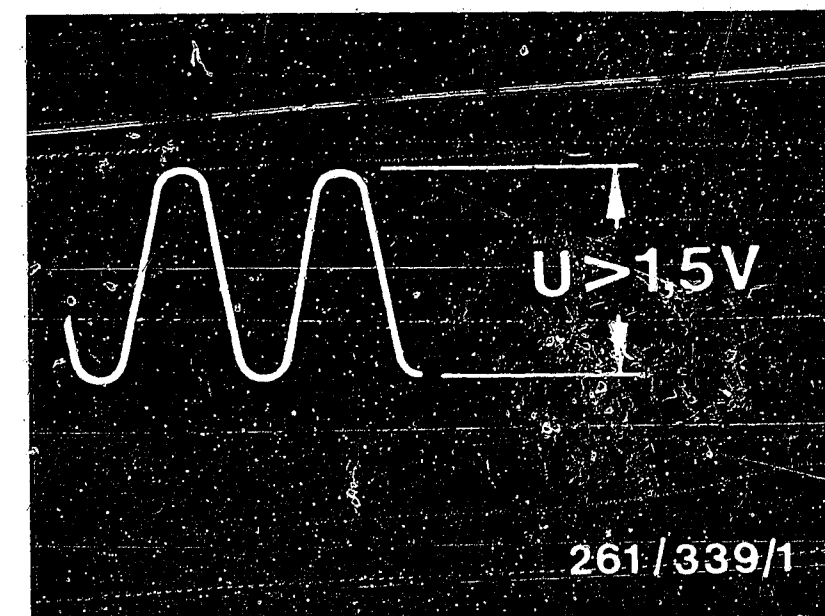
A10

Rapid diagnosis chart
Electronic transmission control BMW



Rapid diagnosis chart for universal test adapter (continued)

Test step	Switch position		Remarks	Test specifications (reading)	For trouble-shooting see coordinate
	V	Ω			
39	18	20	Drive vehicle onto chassis dynamometer. Program switch in position "S". Gear-selector switch in position "D". Engine idling. Measure current at sockets 1 and 2. Current rise in lead 2.	635 CSi, 732i, 735i: <u>950...1050 mA</u> 745i: <u>930...1030 mA</u> at idle	E 21
40	18	20	As test step 39, but press button T1 and accelerate engine. Idle contact on throttle valve opens.	635 CSi, 732i, 735i: <u>580...680 mA</u> 745i: <u>410...510 mA</u> with button T1 pressed	F 23
41	2	20	Connect oscilloscope at test wells. Otherwise as test step 39, but driving speed approx. 10 km/h. Measure rotational-speed sensor signal term. 8 to term. 22.	<u>See top graph</u>	F 1
42	2	20	As test step 41, but driving speed approx. 20 km/h. Increase in signal frequency and voltage amplitude.	<u>See bottom graph</u>	F 3



A11

Rapid diagnosis chart
Electronic transmission control BMW



A12

Rapid diagnosis chart
Electronic transmission control BMW



3. Test specifications

The stated test specifications apply to measurements directly at the component or at the 35-pin plug without test adapter connected.

Rotational-speed sensor (in transmission):

0.7 ... 1.8 k Ω

B22

Program switch in position E and 3 2 1:

0 Ω to ground in each case

C9

Kick-down switch actuated:

0 Ω

C11

Solenoid-operated valves (in transmission) MV 1 and MV 2, reverse-gear lock and converter clutch, each:

22 ... 60 Ω

C13

Pressure regulator (in transmission):

1.7 ... 4.5 Ω

C21

Gear-selector switch in position 1, 2, 3, D, N, R, P

U_B with ignition on.

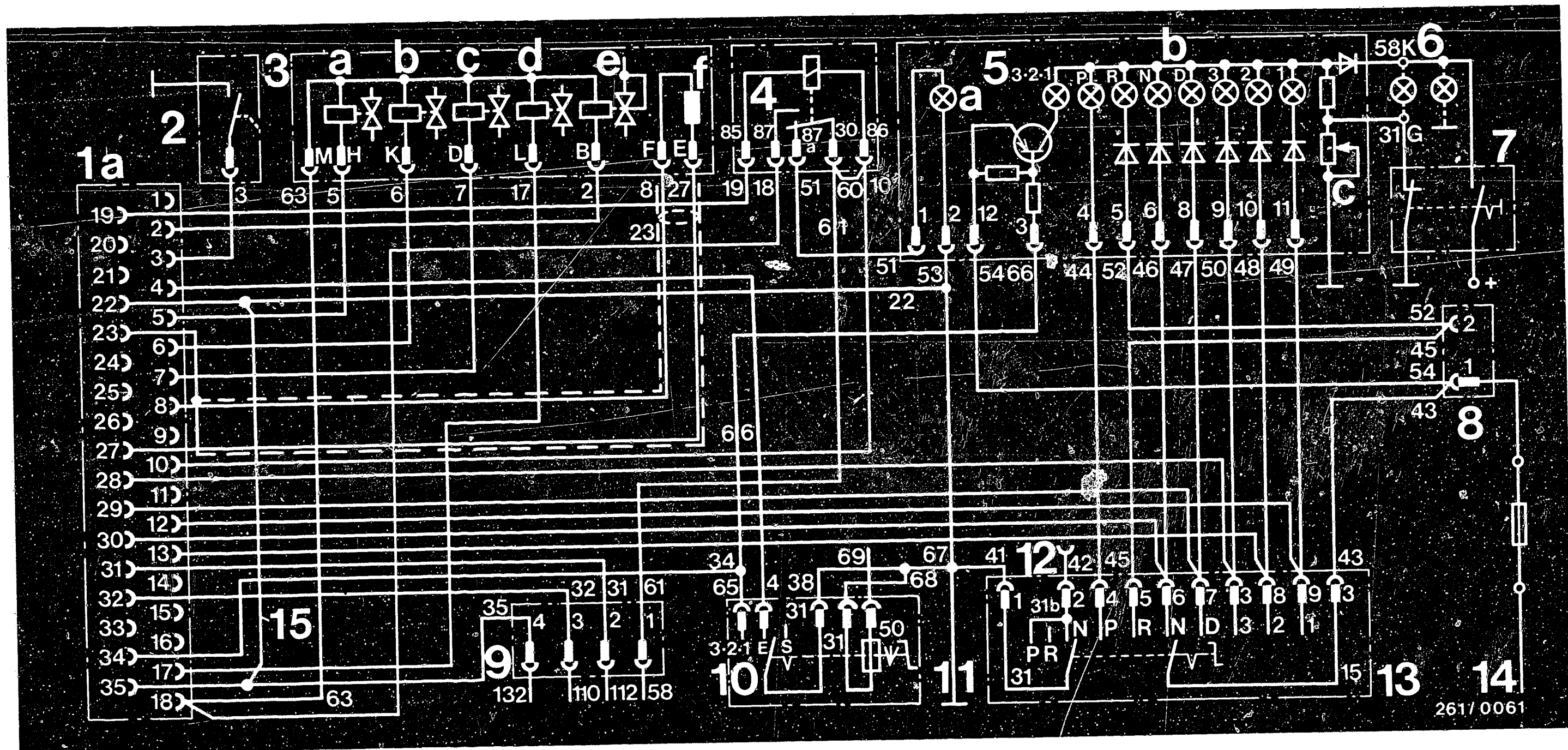
D3

A13

Test specifications

Electronic transmission control BMW





4. Electrical terminal diagram

1a = Transmission control
Wiring-harness plug
Control-unit end
2 = Kick-down switch
3 = Transmission
3a = Solenoid-operated valve 1

3b = Solenoid-operated valve 2
3c = Solenoid-operated valve - reverse gear
lock
3d = Solenoid-operated valve - converter
clutch
3e = Pressure regulator

3f = Output speed sensor
4 = Transmission relay
5 = Indicator unit
5a = Warning lamp for electronic
transmission control
5b = Gear indicator

A14

Electrical terminal diagram

Electronic transmission control BMW



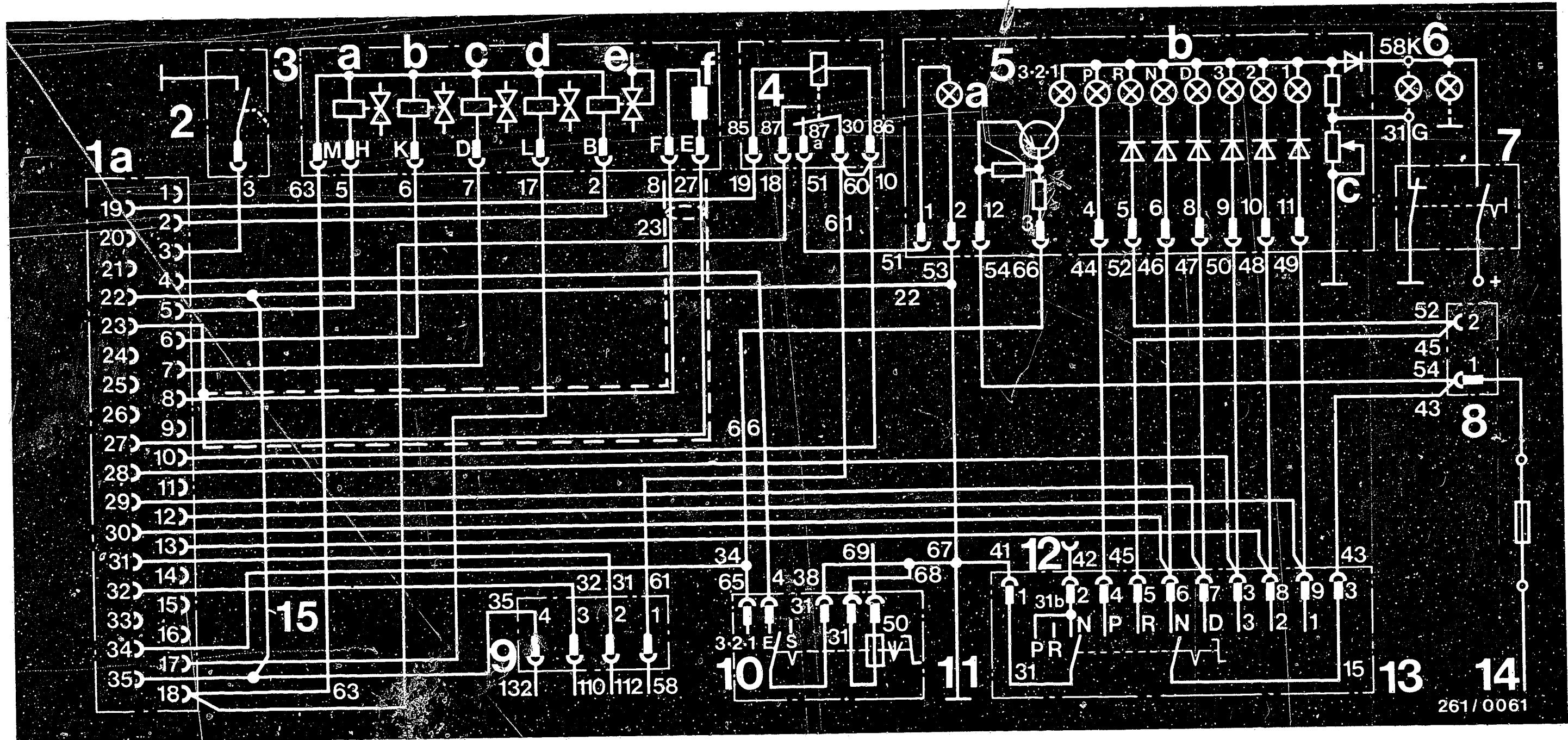
A15

Electrical terminal diagram

Electronic transmission control BMW



261/0061



4. Electrical terminal diagram (continued)

5c = Brightness control
 6 = Instrument illumination
 7 = Light switch
 8 = Backup lamp
 9 = Plug connector with lead (7 series);
 (58 to main relay term. 87;
 110, 112, 132 only 745i:
 to knock control unit)

10 = Programme switch
 (69 = To Term. 50 on starting motor)
 11 = Instrument carrier ground point
 12 = To starting disable relay Term. 85
 13 = Selector switch (drive mode)
 14 = To ignition and starting switch Term. 15
 15 = Connection not with 745i



5. Installation position of components

Control unit (combined with Motronic):

7 series: In front-passenger footwell behind right-hand side panel.

6 series: In glove compartment.

Speed sensor)	
Solenoid-operated valves)	in transmission
Pressure regulator)	

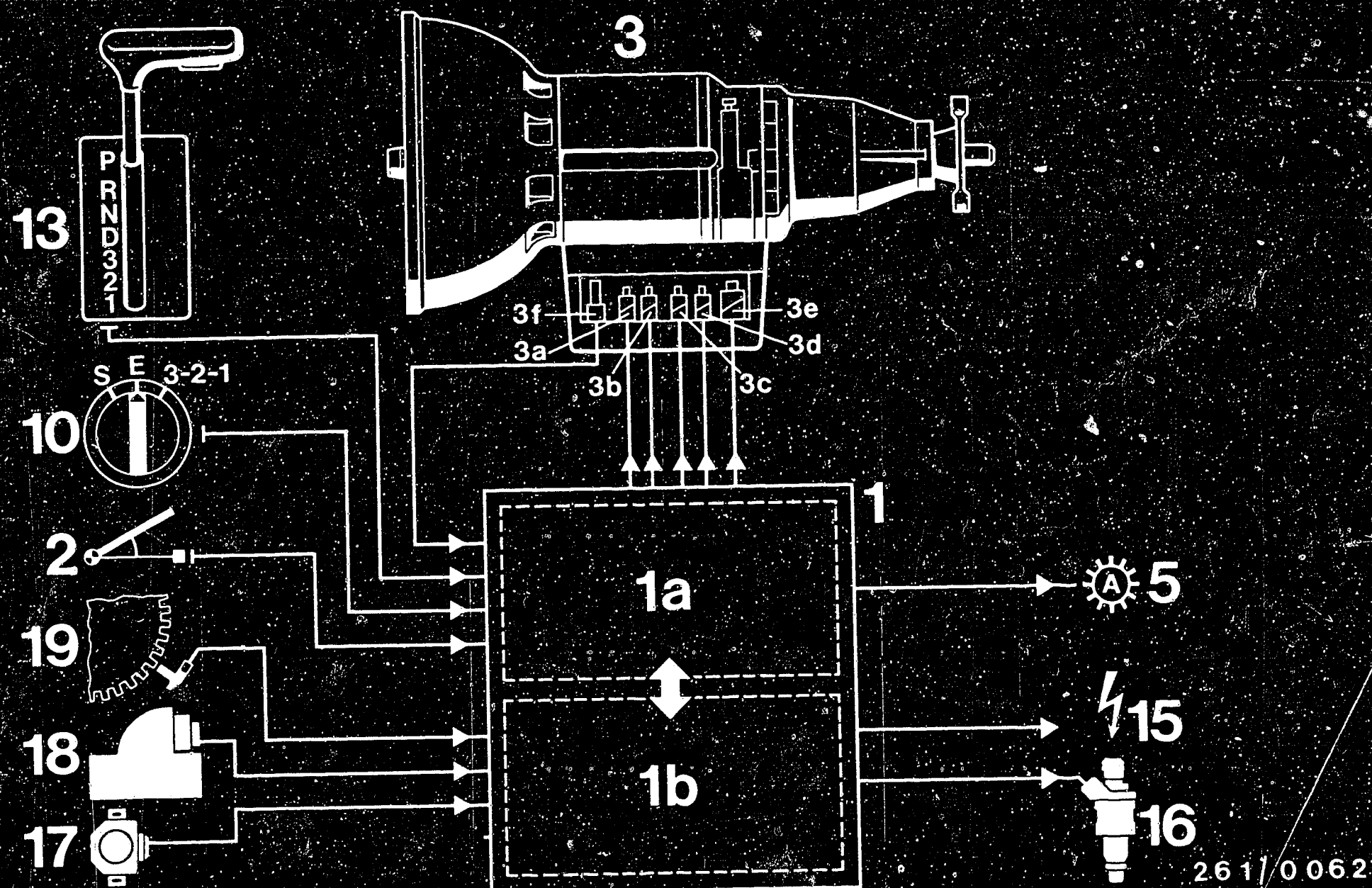
Relay for transmission control: In front-passenger footwell behind right-hand side panel.

Selector switch)	
Program switch)	on driver's console

Indicator unit)	
Warning lamp for)	
electron. transmission)	in instrument panel
control)	

Kick-down switch: Under accelerator





6. Basic circuit diagram

1 = Electronic control unit
 1a = Transmission control
 1b = Motronic
 2 = Kick-down switch
 3 = Transmission
 3a, 3b = Solenoid-operated valves for gear shifting

3c = Solenoid-operated valve - reverse gear lock
 3d = Solenoid-operated valve - converter clutch
 3e = Pressure regulator
 3f = Output speed sensor
 5a = Warning lamp for electronic transmission control

10 = Program switch
 13 = Selector switch
 15 = Ignition
 16 = Injection
 17 = Throttle-valve switch
 18 = Air-flow sensor
 19 = Engine-speed sensor



7. Test equipment and tools

Universal test adapter	ETT 018.01	0 684 101 801
Adapter lead		1 684 463 140
Motortester	e.g. MOT 002.00 or 200	0 684 000 200
Multimeter (analog display, internal resistance min. 20 k Ω /V)		Commercially available e.g. Metrawatt GmbH, type MA2H or Chinaglia, type Cortina
Chassis dynamometer	e.g. LPS 96 or LPS 002	0 680 017 001 0 680 100 200



8. Important general information

The electronic transmission control and the Motronic have a joint control unit. For this reason, this manual also includes special information for the Motronic.

Be sure to follow the information in order to prevent damage to transmission, engine, control unit or ignition coil, and also to avoid danger to persons.

8.1 Never start the engine without securely connected battery.

8.2 Incorrect polarity of the supply voltage, e.g. through incorrect connection of battery or ignition coil, may lead to the destruction of the control unit.

8.3 Do not use a fast charger for starting the engine.

Starting ~~aid~~ should be exclusively by means of a second 12 V ~~battery and~~ jump leads.

Caution! Due to different requirements of vehicle manufacturers as regards electronic products, we recommend that 24 V batteries not be used as a starting aid. Observe the instructions in the vehicle owner's manual.

8.4 Disconnect the battery from the vehicle electrical system before fast charging.

Observe the operating instructions for the fast charger.

8.5 Do not disconnect the battery from the vehicle electrical system with the engine running.

8.6 Do not short ignition coil Term. 1 to ground (e.g. for stopping the engine). Ignition coil and, possibly, control unit will be destroyed.



8.7 Battery + must not be connected to ignition coil Term. 1. Control unit will be destroyed.

8.8 Never connect or disconnect wiring-harness plug of control unit with ignition on.

8.9 Remove the control room unit at temperatures above 80 °C (e.g. paint-drying installation).

8.10 Remove the control unit before carrying out welding work (electric spot welding).

8.11 Before compression test, remove plug from relay set. This prevents undesired injecting of the injection valves.

8.12 If installing an alarm system, follow the installation instructions for Motronic vehicles or Technical Bulletin "New Product" VDT-I-335/110.

It must be ensured that the alarm relay is not subjected to interference from extraneous fields (e.g. from H.T. ignition cables), thus causing it to trip incorrectly.

8.13 The Motronic with transmission control contains a high-energy ignition system which can be very dangerous if live parts or terminals are touched (both on the primary as well as secondary side).

In this connection, we should like to point out that the VDE regulations, in particular VDE 01 04/67, must be observed when working on or testing the ignition system.



Always switch off the ignition when working on the ignition coil (switch off ignition/voltage source). Such work includes:

- Connection of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of parts of the ignition system (spark plug, ignition coil, high-voltage distributor, ignition cable etc.).

If, when testing the ignition system or when performing adjustment operations on the engine, it becomes necessary to switch on the ignition, (switch on ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual components of the ignition system (e.g. high-voltage distributor, ignition coil, control unit and ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and on testers.

Transmission oil

In the case of automatic transmissions, even slight deviations from the prescribed oil level or incorrect grade of oil can lead to a noticeable deterioration in the quality of gear-shifting. In the case of major deviations, even incorrect shifting is possible.



9. Trouble-shooting

9.1 Important information

Motronic and transmission control use a common control unit and, in some cases, the same sensors.

For this reason, the functioning of the transmission control presupposes that the Motronic is in proper working order.

This means that, in the event of a total failure or complaints as regards driveability, it is necessary first of all to check the Motronic. If, however, it is clear that the transmission control is the cause and complete testing of the Motronic is to be dispensed with, it is necessary in any case to check the temperature sensor NTC II (coolant), the engine speed, the air-flow sensor as well as the idle and full-load contacts, and, for the 745i, the full-load function of the knock control unit.

The customer complaints listed below and their causes refer exclusively to components of the electronic transmission control. Other customer complaints regarding the transmission control are to be found in the transmission mechanism, in the gearbox, on the hydraulic control unit and in the mechanism of the selector lever, program switch and selector switch. The last-mentioned components are not supplied by Bosch.

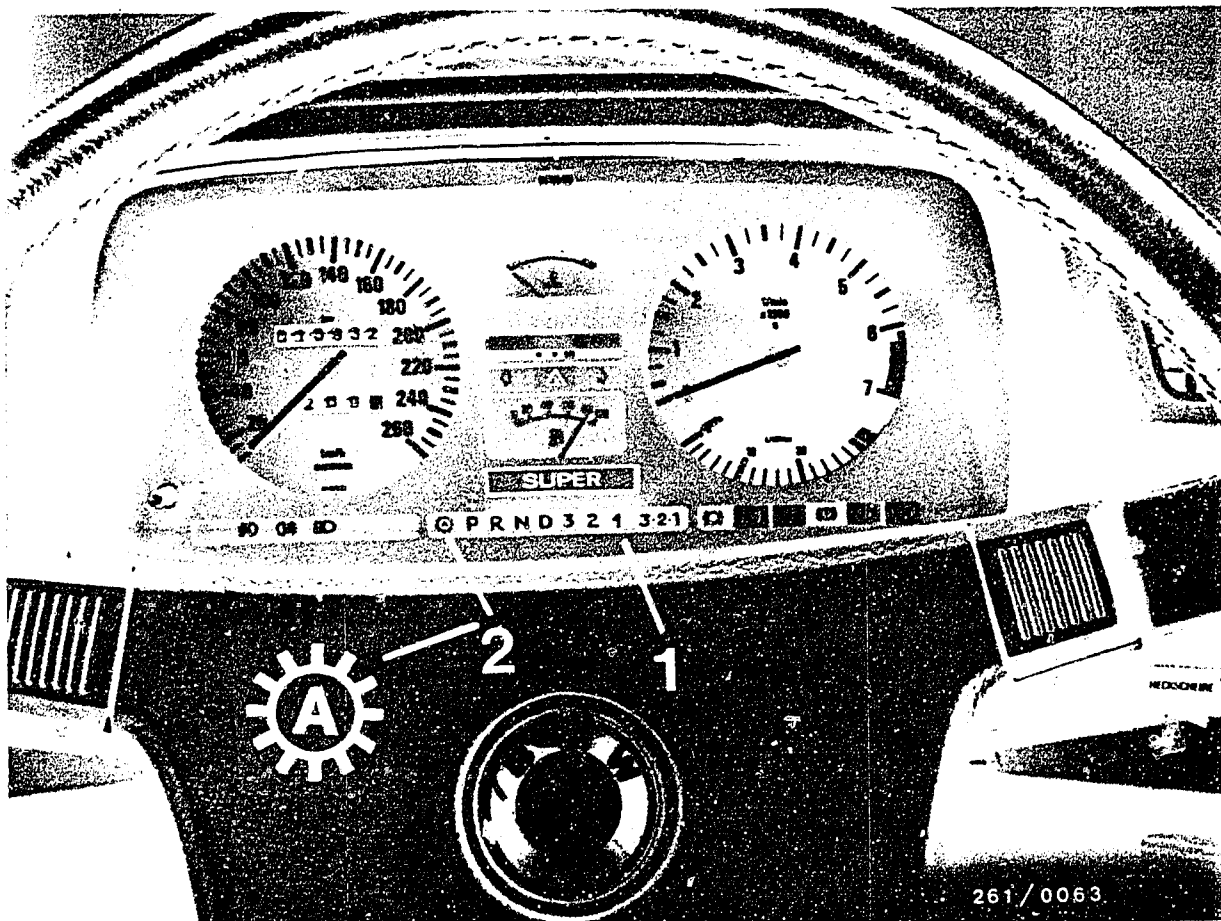
The repair of the components and of the transmission is not intended. The transmission must be repaired in a specialist workshop and is available as an exchange transmission.



All the causes (component faults) listed in the table are covered by the universal test adapter. The table provides a better overview and gives information on the relationship between cause and effect on driveability. Basically, it is advisable to carry out the entire test program with the universal test adapter.

Both a defective control unit as well as defective components ~~can~~ lead to mutual damage. For example, a short-circuit to ground on the solenoid-operated valve may lead to the destruction of the control unit.





1 = Indicator unit

2 = Warning lamp for electronic transmission control

9.2 Function of warning lamp for electronic transmission control

After switching on the ignition, the warning lamp lights up. Whenever the engine is started, the electronic control unit performs a self-check. The warning lamp goes out if there is no fault.

Even while the vehicle is moving, the electronic control unit monitors the functions which are necessary for operation in order to prevent critical situations or to prevent the engine from overrevving on the overrun.

The following causes lead to the warning lamp lighting up:

- Failure of speed sensor or of solenoid-operated valves
- Defective output stage in control unit
- Defective circuit components in control unit
- Overrevving of engine
- Incorrect shifting down into 2nd gear.

With the lighting up of the warning lamp the transmission relay switches off the power supply to the solenoid-operated valves and the pressure regulator.

The effect of the safety function is that it is possible to continue driving in 3rd gear. Likewise, reverse gear can still be selected, but the reverse gear lock is ineffective.

The fault information is cleared after switching off the ignition.

Note: Not every fault which has led to the warning lamp lighting up will cause it to light up again after renewed starting of the engine and after repeated driving.



Trouble-shooting according to customer complaints

1. Warning lamp for electronic transmission control lights up
2. Engine fails to start
3. Engine stalls with drive mode selected
4. No gear-shifting or gear-shifting not correct
5. Gear shifts not smooth
6. Manual shifting down from 3 to 2 or from 2 to 1 not O.K.
7. Jerk when shifting from P to R or from N to R
8. Reverse gear cannot be selected

								Cause (component fault)	Coordinate
●	●	●	●	●	●	●	●	Test with universal test adapter (covers all components)	Starting on B9
	●							Set selector switch, or selector switch defective	D3...D24
		●						Program switch defective	C5, C9, E1...E4
		●						Kick-down switch defective, contact O.K.?	C1, C11
●								Transmission relay defective	C23, D1
●			●					Plug on transmission not plugged on or defective	--
●			●					Fuse for transmission control defective	--
	●		●					Ground terminal open circuit or with contact resistance	C7
				●				Lead to pressure regulator shorting to ground	C21
		●						Lead to solenoid-operated valve shorting to ground (Consequential damage: Control unit may be defective)	C3, C13...C19

B5

Trouble-shooting
Electronic transmission control BMW



B6

Trouble-shooting
Electronic transmission control BMW



1. Warning lamp for electronic transmission control lights up

2. Engine fails to start

3. Engine stalls with drive mode selected

4. No gear-shifting or gear-shifting not correct

5. Gear shifts not smooth

6. Manual shifting down from 3 to 2 or from 2 to 1 not O.K.

7. Jerk when shifting from P to R or from N to R

8. Reverse gear cannot be selected

Cause (component fault)								Coordinate
			●					B16...B21
			●					B22, F1...F4
				●		●		C21
			●					C13...C18
		●						C19
●	●	●	●	●	●	●	●	E5...E24
Electronic control unit defective. Only replace control unit if the above-mentioned causes can be ruled out.								



10. Test with universal test adapter ETT 018.01
(0 684 101 801) and adapter lead for transmission
control (1 684 463 140)

Connect universal test adapter to transmission wiring harness (ignition must be off).

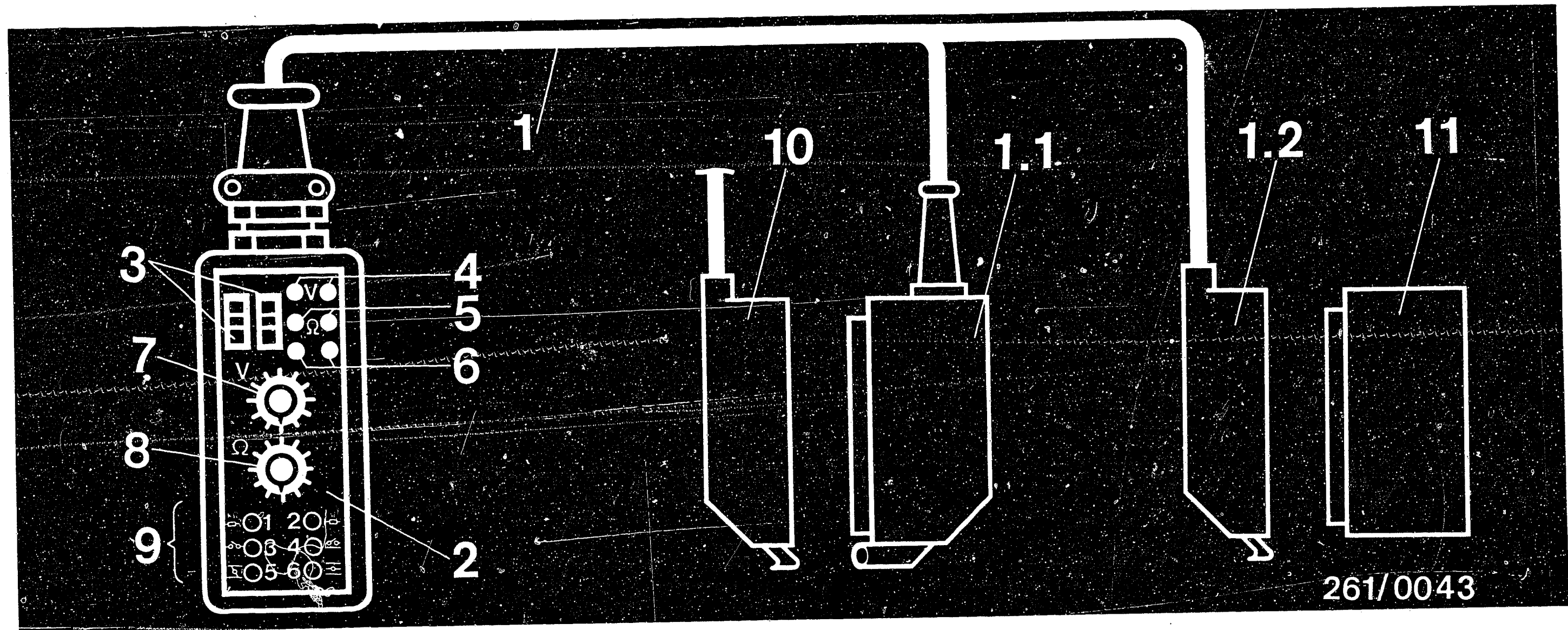
For testing the wiring harness and the components connected to it, only the transmission wiring harness must be connected, but not the control unit. Be sure to follow the instructions in the test chart.

In order to make readings, a measuring instrument for voltage, current and resistance (multimeter) as well as the motortester must be connected to the test adapter.

The program switch of the test adapter is used for selecting the individual test steps. The symbols "V" and "Ω" show the operator whether voltage or resistance is being measured. Some switch positions are also required for simulation with the engine running. By pressing the buttons with the control unit connected and the engine running it is possible to intentionally change, i.e. to simulate, operating conditions. Thus, for example, with the engine running, it is possible by pressing button T1 to make the control unit think that the kick-down switch has been actuated, and then the reaction of the control unit can be evaluated on the multimeter.

If necessary, the circuit diagram can be used for trouble-shooting.





261/0043

Universal test adapter with adapter lead for transmission control

- 1 = Adapter lead
- 1.1 = Connection to wiring harness
- 1.2 = Connection to control unit
- 2 = Universal adapter (part no.: 0 684 001 801)
- 3 = Test wells (for motortester)
- 4 = Test sockets (for voltage measurement)
- 5 = Test sockets (for resistance measurement)
- 6 = Test sockets (for current measurement)
- 7 = Program switch "V"
- 8 = Program switch "Ω"

- 9 = Button panel for simulation of operating conditions
- 10 = Transmission wiring harness
- 11 = Control unit
- Button 1 = Simulation of kick-down switch
- Button 2 = Not occupied
- Button 3 = Energization for transmission relay
- Button 4 = Not occupied
- Button 5 = Not occupied
- Button 6 = Not occupied

B 10

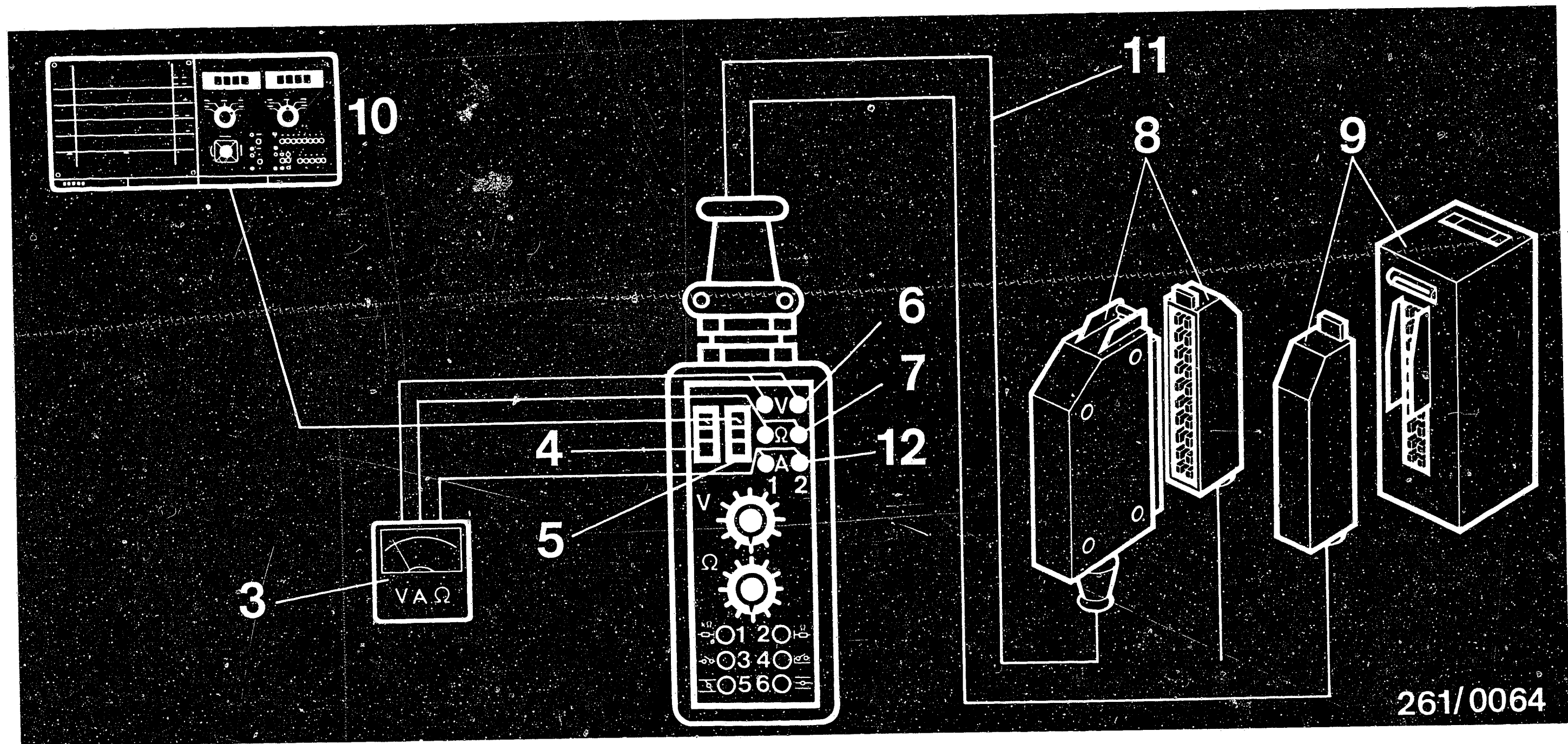
Test with universal test adapter
Electronic transmission control BMW



B 11

Test with universal test adapter
Electronic transmission control BMW





Terminal diagram for universal test adapter

- 3 = Multimeter
- 4 = Red connection socket (test well) for red terminal of motortester
- 5 = Black connection socket (test well) for black terminal of motortester
- 6 = Connection of voltmeter to V sockets (red = +, black = ground or -)

- 7 = Connection of ohmmeter to Ω sockets (blue)
- 8 = Connection to transmission wiring harness
- 9 = Connection to transmission control unit
- 10 = Motortester
- 11 = Adapter lead for transmission control
- 12 = Connection of ammeter (black sockets, 1 = -, 2 = +)

B 12

Test with universal test adapter
Electronic transmission control BMW



B 13

Test with universal test adapter
Electronic transmission control BMW



Preparations for testing with universal test adapter

Remove control unit and connect test adapter.

Installation position of control unit: 7 series: In front passenger footwell
behind right-hand side panel.
6 series: In glove compartment

To remove, push the detent to the rear, hinge up plug in direction of arrow and unhook.

The control unit is fastened by 4 screws (see bottom picture).

Notes:

To rule out any confusion between the plugs of the different systems, a mechanical latching method has been introduced. The "lug" (pivot point when opening and connecting the control unit) and the corresponding mount on the control unit have matching recesses and pins.

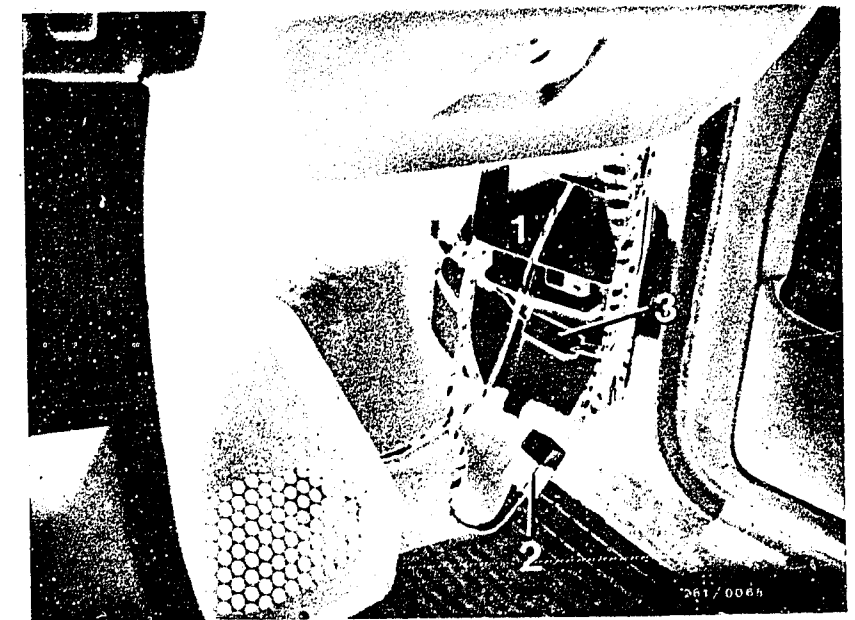
In addition to this mechanical latching method, the two 35-pin plugs have been marked differently. The transmission plug has a yellow cable binder, and the Motronic plug has a green cable binder.

As a basic rule of trouble-shooting it should be noted that all plug connections must be checked for security, good contact and corrosion. The spring contacts in the plug connectors must be latched in position and must not allow themselves to be pushed back.

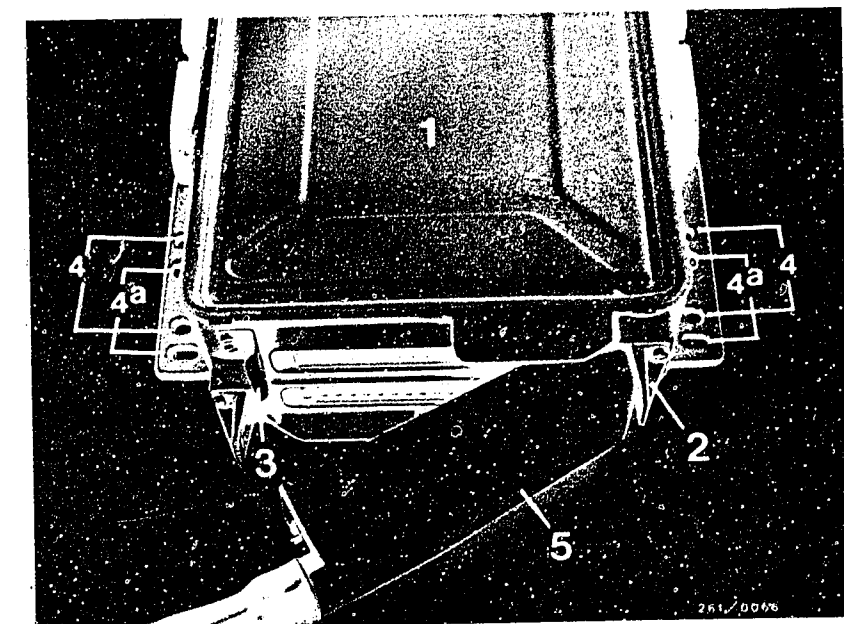
Where the instruction "test lead" appears in the trouble-shooting, this means: Test the lead for continuity, short circuit to ground and contact with other leads. Watch for signs of wear and pinching.

Note:

In the following test steps a white border in the "Operation" column indicates which operation has to be changed compared to the preceding test step.



- 1 = Control unit (7 series)
- 2 = Transmission relay
- 3 = 4-pin plug connector
- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug



B14

Test with universal test adapter
Electronic transmission control BMW



B15

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 1 Control unit not connected

Operation:

Program switch "V" at position



Program switch "Ω" at position

1

Measuring equipment:

Ohmmeter

Measuring range:

1 M Ω

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition
Selector switch in position P

Reading:

On multimeter:
Greater than 100 kΩ

If reading O.K.,
continue testing with
next test step.

Testing:

Component:
Speed sensor

Operation:

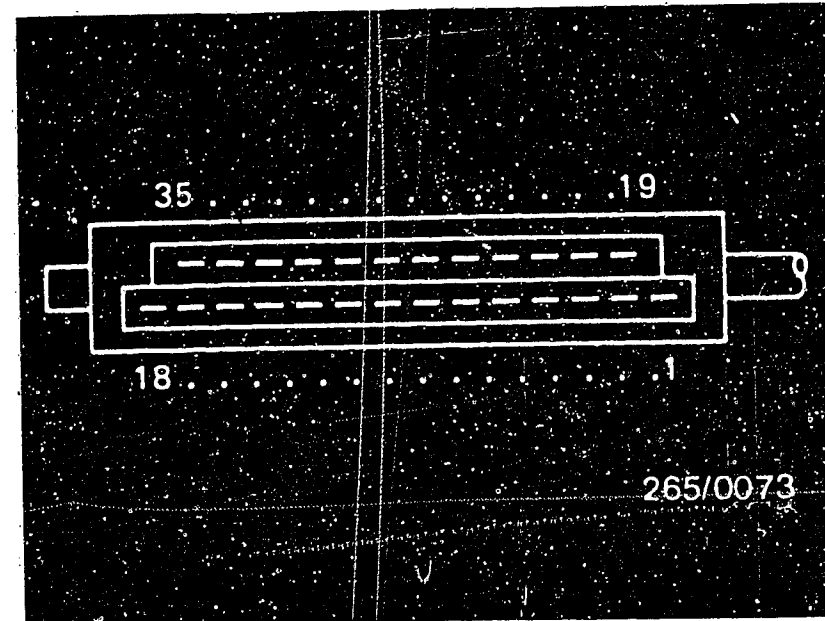
Insulation of Term. 23
(shielding) from Term. 22
(ground)

Malfunction:

Resistance less than 100 kΩ

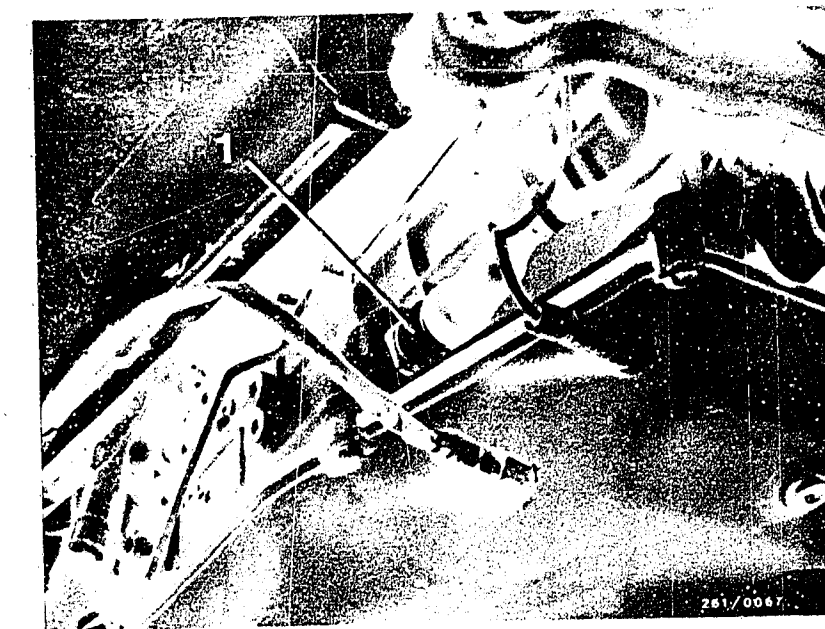
Trouble-shooting:

Check shielding (on Term. 23) for short circuit to ground.
Watch for damage to lead to transmission.



Top view of 35-pin multiple plug of transmission wiring harness

1 = Plug connector on transmission



B 16

Test with universal test adapter
Electronic transmission control BMW



B 17

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 2

Operation:

Program switch "V" at position



Program switch "Ω" at position

2

Measuring equipment:

Ohmmeter

Measuring range:

1 M Ω

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition
Selector switch in position P

Reading:

On multimeter:

Greater than 100 kΩ

If reading O.K.,
continue testing with
next test step.

Testing:

Component:

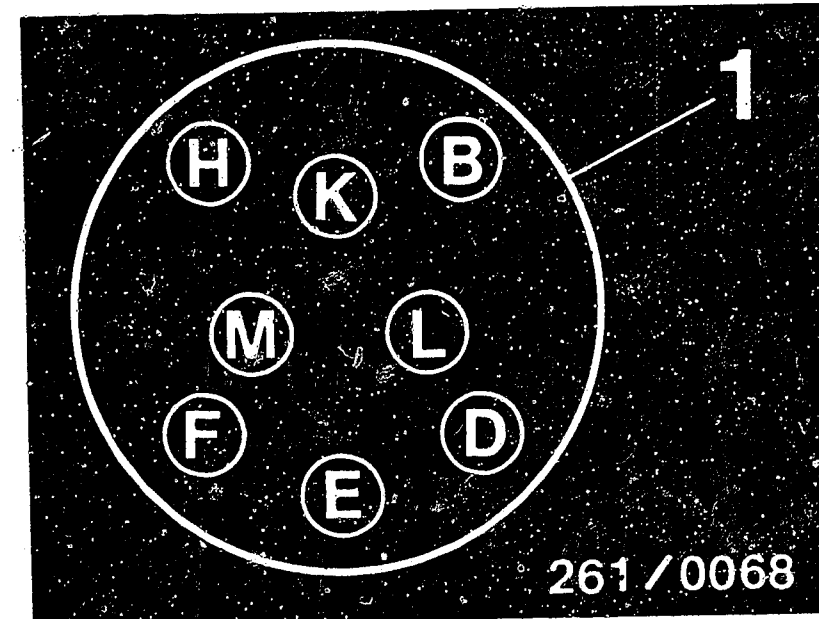
Speed sensor

Operation:

Insulation of Term. 8 from
Term. 22 (ground)

Malfunction:

Resistance less than 100 kΩ



1 = Top view of plug part on transmission

1 = Plug connector on transmission

Trouble-shooting:

Resistance approx. 0 Ω or less than 100 kΩ:

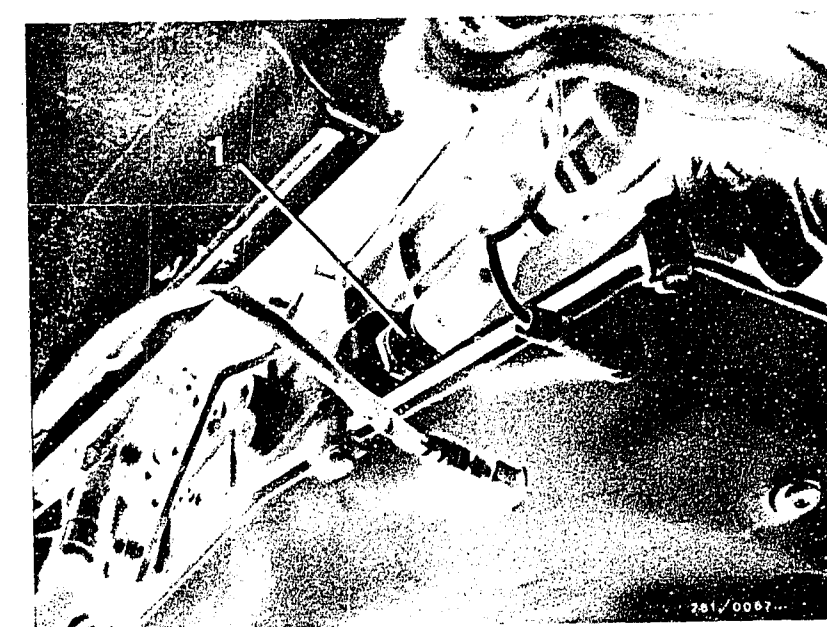
Check lead to Term. 8 for short circuit to ground. To do this, remove plug from transmission.

Resistance approx. 1.1 kΩ or less than 100 kΩ:

Check lead to Term. 27 for short circuit to ground. To do this, remove plug from transmission.

If leads to speed sensor in transmission O.K., on plug section on transmission test terminals E and F from speed sensor for short circuit to ground.

If short circuit to ground in transmission, the transmission must be replaced.



B 18

Test with universal test adapter
Electronic transmission control BMW



B 19

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 3

Operation:

Program switch "V" at position



Program switch "Ω" at position

3

Measuring equipment:

Ohmmeter

Measuring range:

1 M Ω

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition
Selector switch in position P

Reading:

On multimeter:

Greater than 100 kΩ

If reading O.K.,
continue testing with
next test step

Testing:

Component:

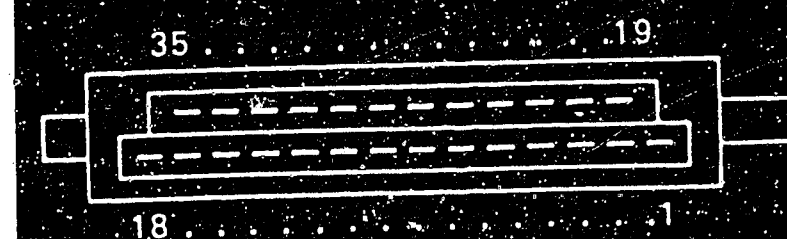
Speed sensor

Operation:

Insulation between shielding
(Term. 23) and speed sensor
lead (Term. 27)

Malfunction:

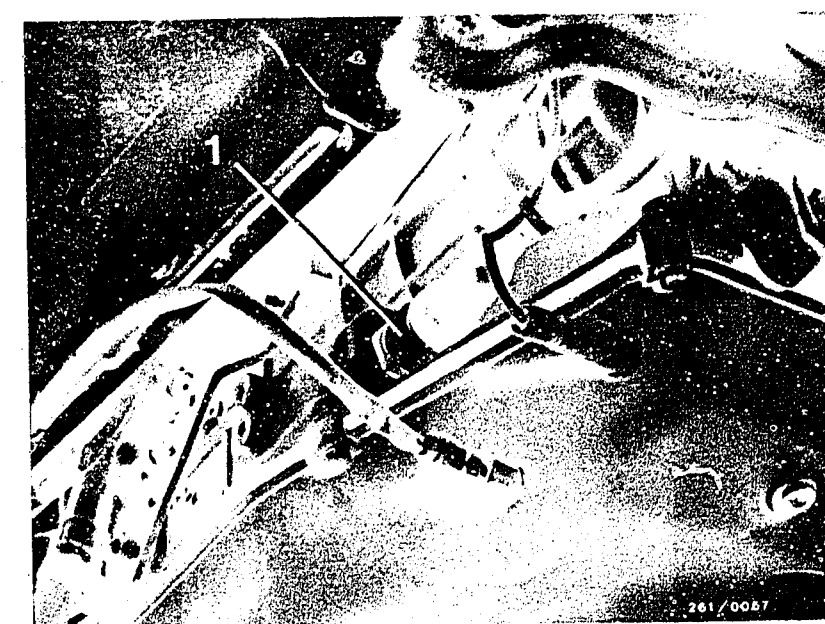
Resistance less than 100 kΩ



265/0073

Top view of 35-pin multiple
plug of transmission wiring
harness

1 = Plug connector on
transmission



261/0057

Cause:

Shielding of speed-sensor lead has connection
with speed sensor lead.

Trouble-shooting: Open 35-pin transmission plug. Check whether
shielding is in contact with other terminals.
May only be connected to Term. 23. Repair
wiring harness to transmission or replace.

B20

Test with universal test adapter
Electronic transmission control BMW



B21

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 4

Operation:

Program switch "V" at position



Program switch "Ω" at position

4

Measuring equipment:

Ohmmeter

Measuring range:

0 to 10 kΩ

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition
Selector switch in position P

Reading:

On multimeter:

0.7 ... 1.8 kΩ

If reading O.K.,
continue testing with
next test step.

Testing:

Component:

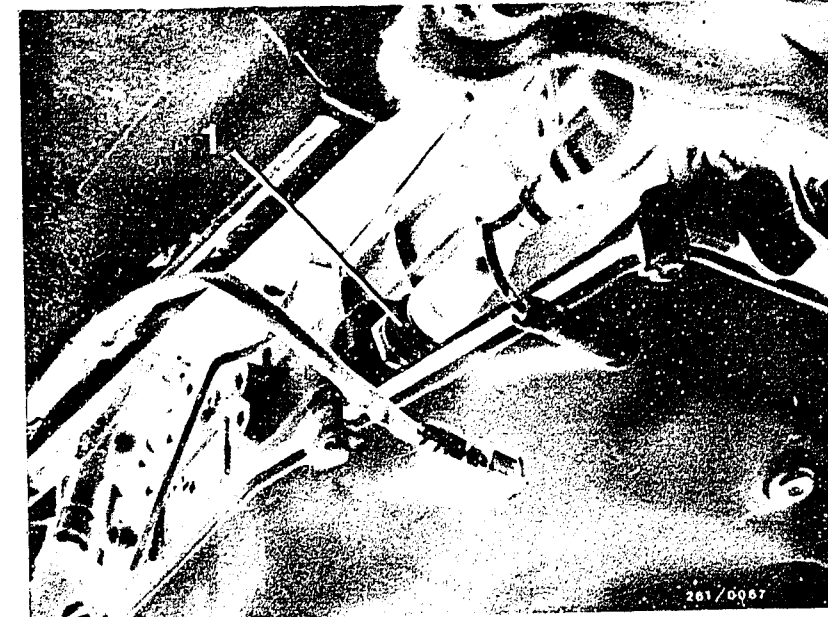
Speed sensor

Operation:

Internal resistance between
Term. 8 and Term. 27

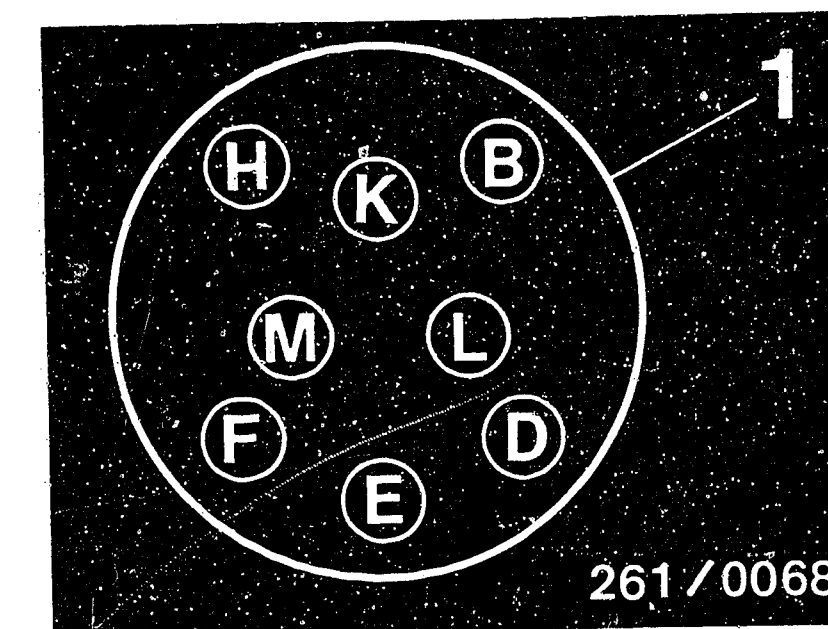
Malfunction:

Resistance outside tolerance



1 = Top view of plug
section on transmission

1 = Plug connector on
transmission



Trouble-shooting:

- Check plug-in connections for corrosion and proper contact.
- Measure internal resistance directly at plug section on transmission, between terminal E and F for speed sensor.
Resistance outside tolerance: Replace transmission.
Resistance correct: Test for continuity in leads to Term. 8 and Term. 27.

B 22

Test with universal test adapter
Electronic transmission control BMW

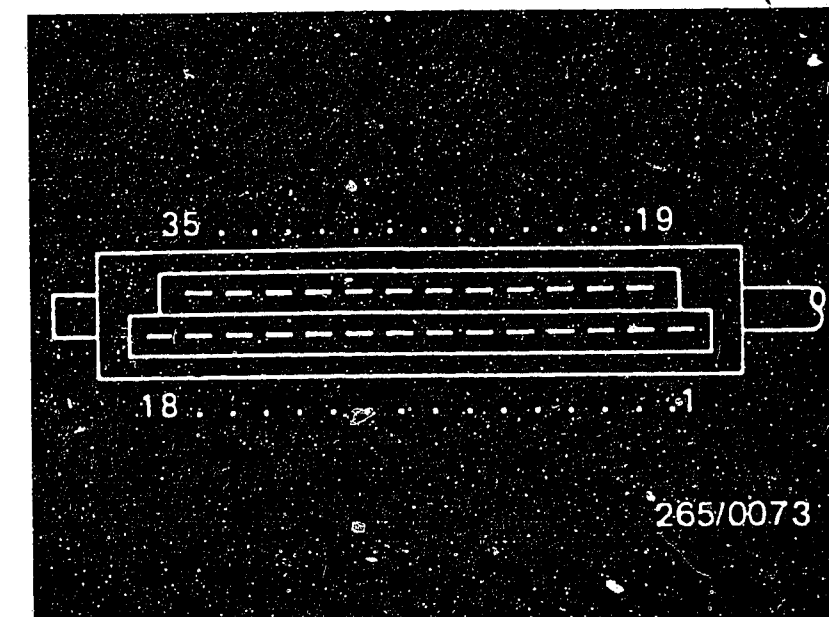


B 23

Test with universal test adapter
Electronic transmission control BMW

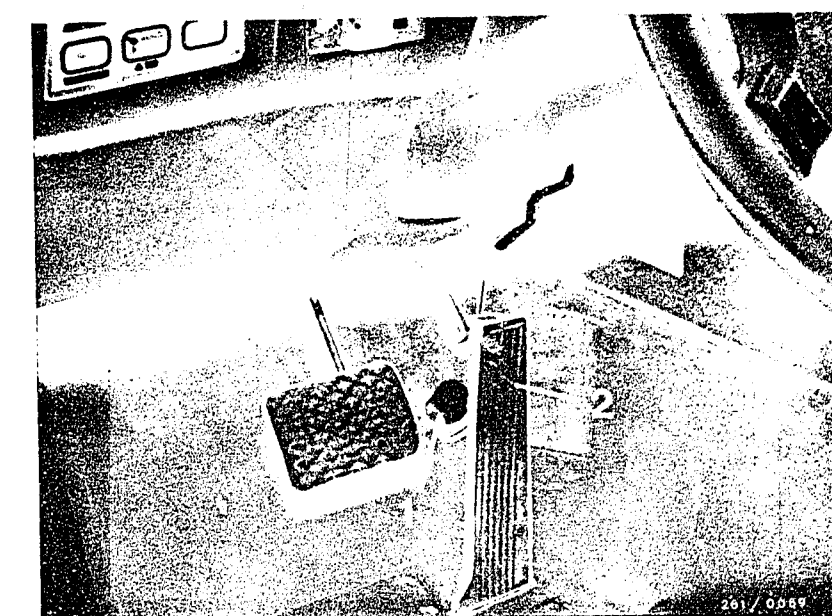


TEST STEP 5			
Operation:		Reading:	Testing:
Program switch "V" at position	↓	On multimeter: Greater than 100 k Ω	Component: Kick-down switch
Program switch "Ω" at position	5	Note: Do <u>not</u> operate accelerator	
Measuring equipment: Ohmmeter			Operation: Contact opens, Shunt resistance Term. 3 to Term. 22 (ground)
Measuring range: 1 M Ω			Malfunction: Resistance less than 100 k Ω
Connection: Test sockets	Ω	If reading O.K., continue testing with next test step.	
Operation in vehicle: Switch off ignition Selector switch in position P			



Top view of 35-pin multiple plug of transmission wiring harness

1 = Kick-down switch
2 = Accelerator



TEST STEP 6

Operation:

Program switch "V" at position



Program switch "Ω" at position

11

Measuring equipment:

Ohmmeter

Measuring range:

1 M Ω

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition

Selector switch in position P

Reading:

On multimeter:

Greater than 100 kΩ

Note:

Do not press buttons on test adapter.

If reading O.K., continue testing with next test step

Testing:

Component:

Solenoid-operated valve and pressure regulator in transmission

Operation:

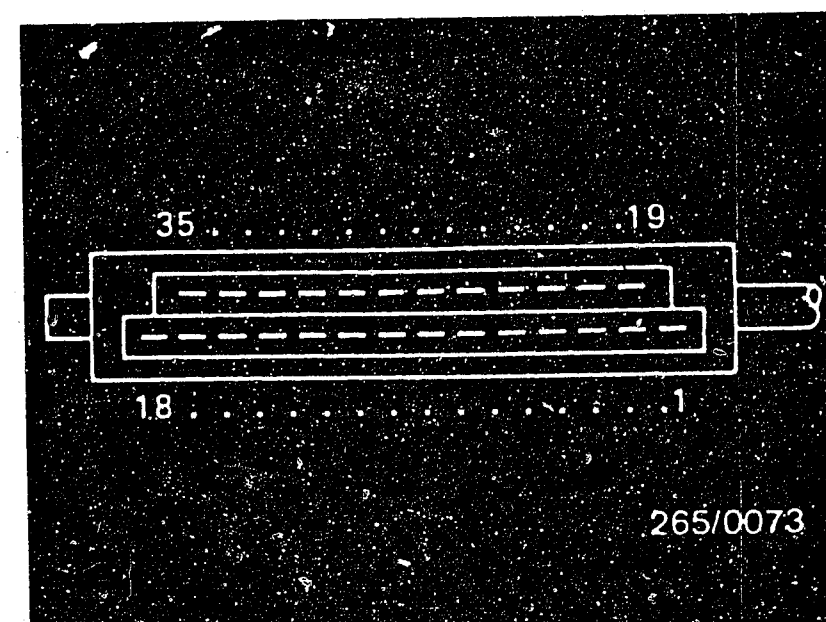
Insulation between Term. 18 and Term. 22 (ground)

Malfunction:

Resistance less than 100 kΩ

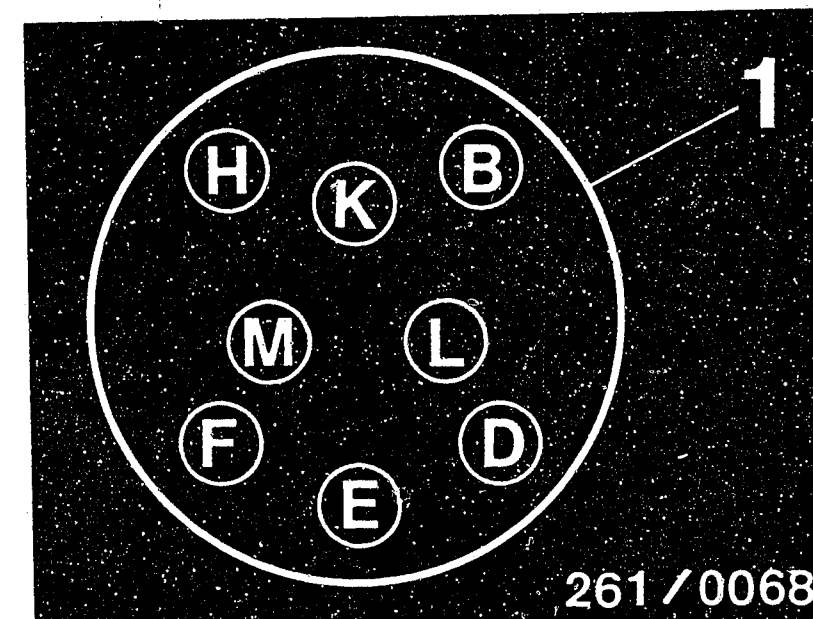
Trouble-shooting:

- Remove plug from transmission and test leads to terminals 2, 5, 6, 7, 17 and 18 individually for short circuit to ground.
- If leads O.K., test short circuit to ground directly at plug section on transmission individually between terminals B, L, D, K, H, M and ground. In case of fault, replace transmission.



Top view of 35-pin multiple plug of transmission wiring harness

1 = Top view of plug section on transmission



C3

Test with universal test adapter

Electronic transmission control BMW




C4

Test with universal test adapter

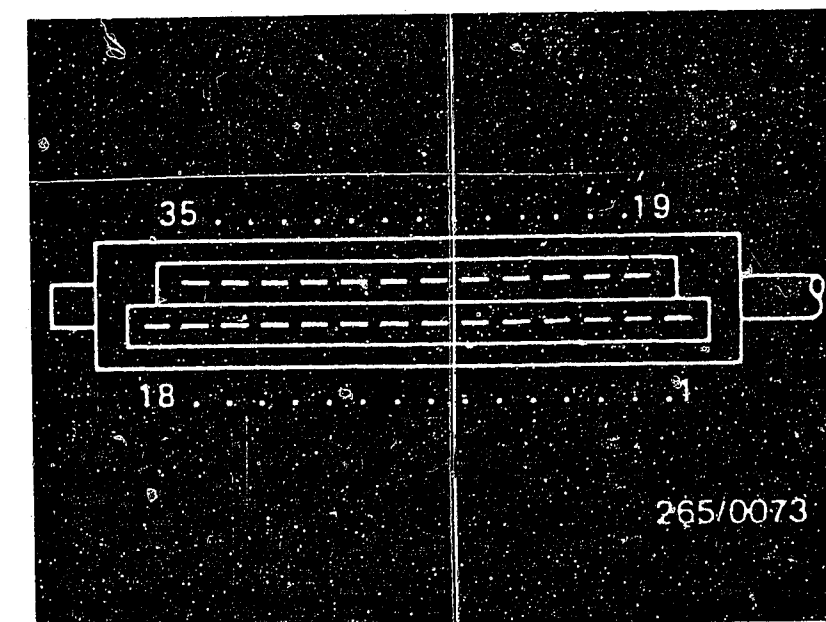
Electronic transmission control BMW



TEST STEP 7		
<u>Operation:</u>	<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u> 	On multimeter: <u>Greater than 100 kΩ</u>	<u>Component:</u> Program switch
<u>Program switch "Ω" at position</u> 12		
<u>Measuring equipment:</u> Ohmmeter		<u>Operation:</u> Insulation between Term. 4 and Term. 22 (ground)
<u>Measuring range:</u> 1 M Ω		
<u>Connection:</u> Test sockets Ω	If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u> Resistance less than 100 kΩ
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P Program switch in position S		

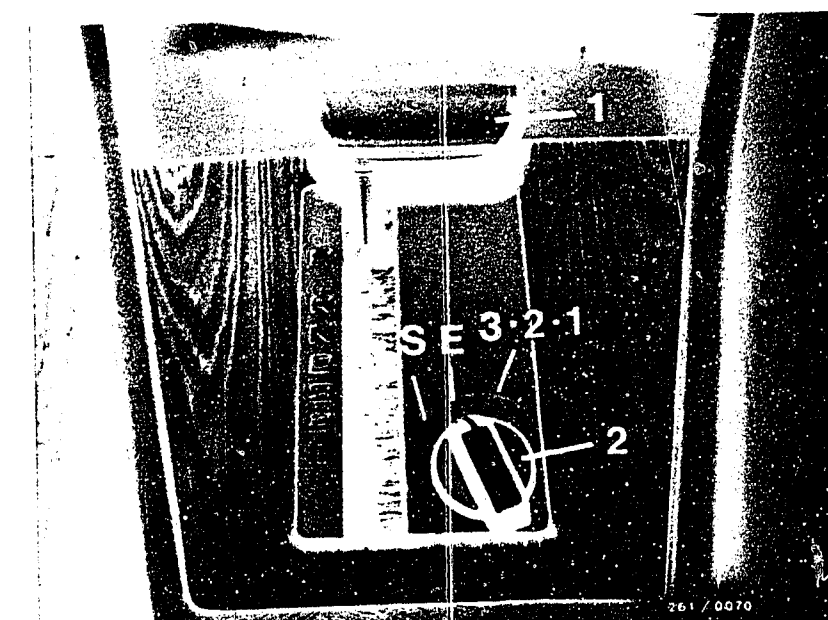
Trouble-shooting:

- Test program switch for short circuit to ground.
- Test lead from control unit Term. 4 to program switch for short circuit to ground.



Top view of 35-pin multiple plug of transmission wiring harness

- 1 = Selector switch
2 = Program switch



C5

Test with universal test adapter
Electronic transmission control BMW



C6

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 8 745i: Knock control unit connected.

Operation:

Program switch "V" at position



Program switch "Ω" at position

13

Measuring equipment:

Ohmmeter

Measuring range:

0 to 10 kΩ

Connection:

Test sockets

Ω

Operation in vehicle:

Switch off ignition
Selector switch in position P

Reading:

On multimeter:
General:

Less than 10 Ω

745i:

1...9 kΩ

If reading O.K.,
continue testing with
next test step

Testing:

Component:

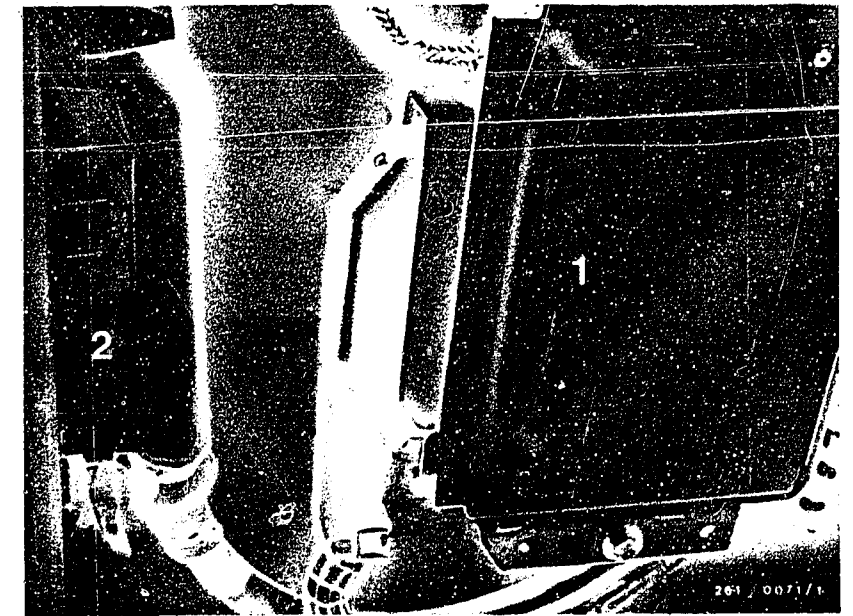
General: Lead to ground
745i: Knock control unit

Operation:

Lead from transmission plug
Term. 35 to Term. 22 (ground)

Malfunction:

Resistance outside tolerance

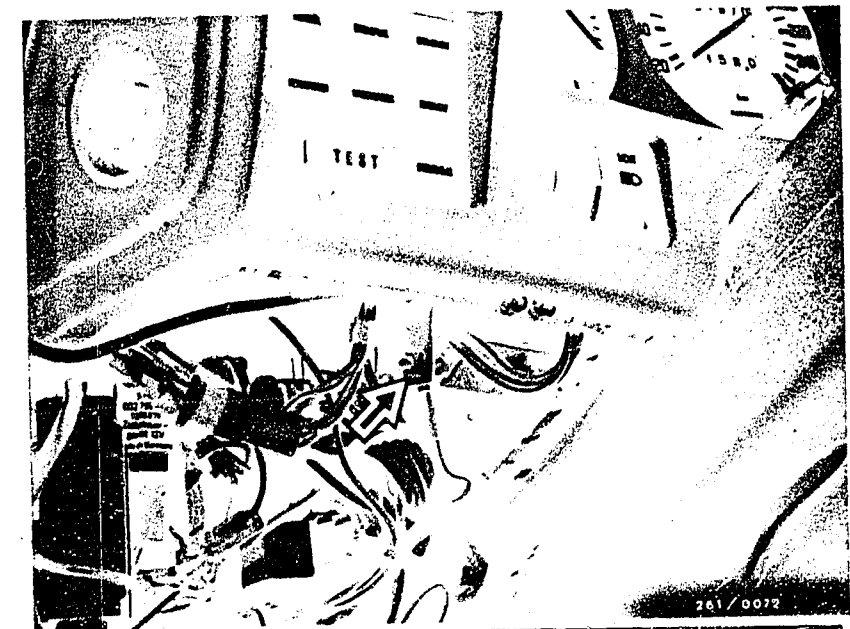


1 = Knock control unit in 745i
2 = ABS control unit

Arrow = Ground terminal for
transmission control

Trouble-shooting:

- 745i: . Test knock control unit plug for security and good contact.
- Test ground terminal for transmission control under instrument panel for security, good bare-metal contact and loose contact.
- 745i: Test knock control unit according to SIS microcard BMW-04/E181.



C7

Test with universal test adapter
Electronic transmission control BMW

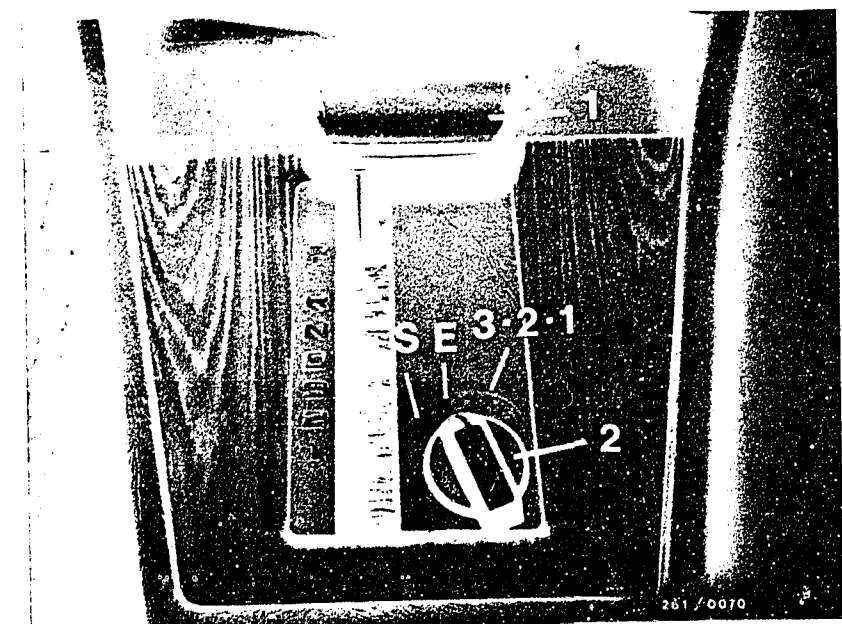


C8

Test with universal test adapter
Electronic transmission control BMW

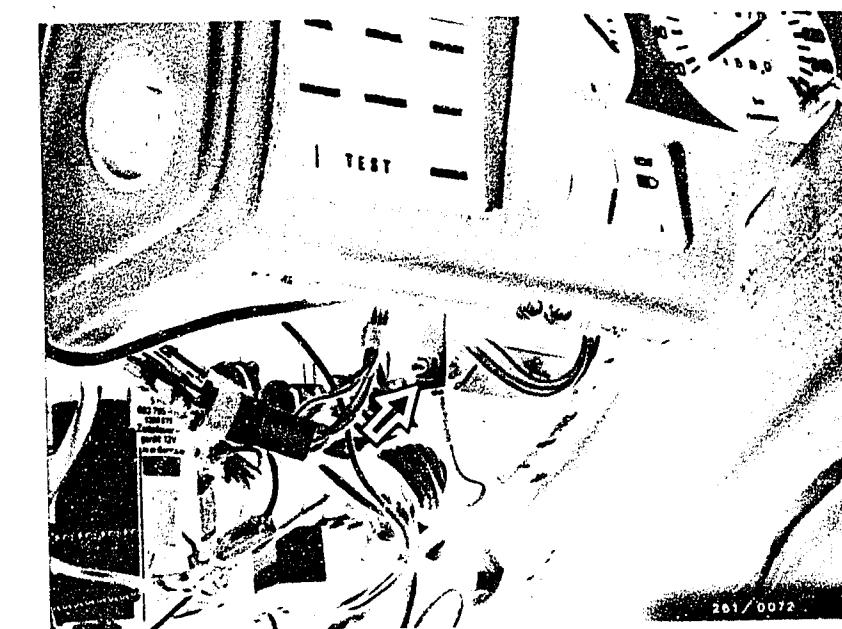


TEST STEP 9		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	↓	On multimeter: <u>Less than 10 Ω</u>	<u>Component:</u> Program switch
<u>Program switch "Ω" at position</u>	14	(Reading is influenced by protective resistor in adapter)	
<u>Measuring equipment</u> Ohmmeter			<u>Operation:</u> Position E for continuity (Term. 4 to Term. 22, ground)
<u>Measuring range:</u> 0 to 10 kΩ			
<u>Connection:</u> Test sockets	Ω		<u>Malfunction:</u> Resistance greater than 10 Ω
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P Program switch in position E		If reading O.K., continue testing with <u>next test step.</u>	



1 = Selector switch
2 = Program switch

Arrow = Ground terminal for
transmission control



Trouble-shooting:

- Test ground terminal for transmission control under instrument panel for security, good bare-metal contact and loose contact.
- Test lead from ground terminal to program switch Term. 31 including plug connector for continuity.
- Test lead including plug connector from control unit Term. 4 to program switch.
- Program switch defective

C9


Test with universal test adapter
Electronic transmission control BMW



C10

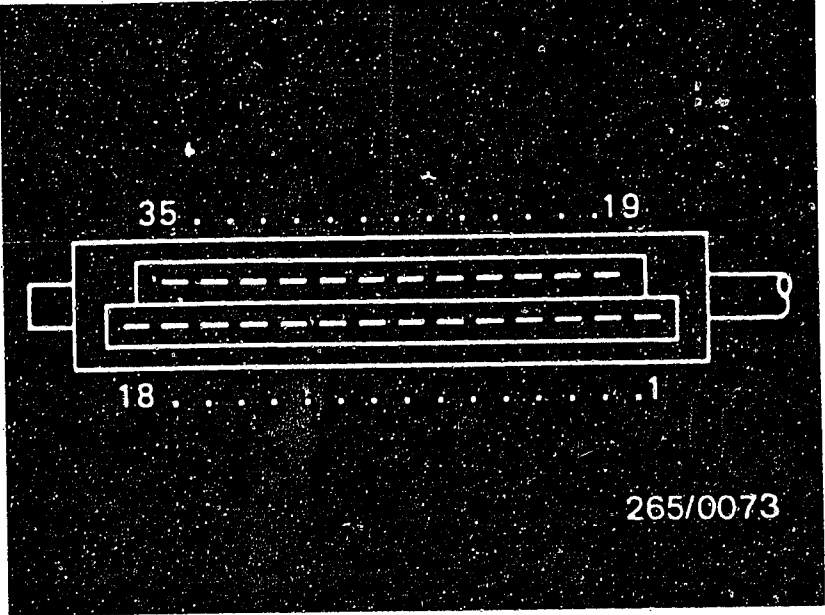
Test with universal test adapter
Electronic transmission control BMW



TEST STEP 10		
Operation:	Reading:	Testing:
Program switch "V" at position 	On multimeter: Less than 10 Ω	Component: Kick-down switch
Program switch "Ω" at position 15	(Reading is influenced by protective resistor in adapter)	
Measuring equipment: Ohmmeter		Operation: Contact for continuity (Term. 3 to Term. 22, ground)
Measuring range: 0 to 10 k Ω		
Connection: Test sockets Ω		Malfunction: Resistance greater than 10 Ω
Operation in vehicle: Switch off ignition Selector switch in position P Accelerator pressed all the way down	If reading O.K., continue testing with next test step.	

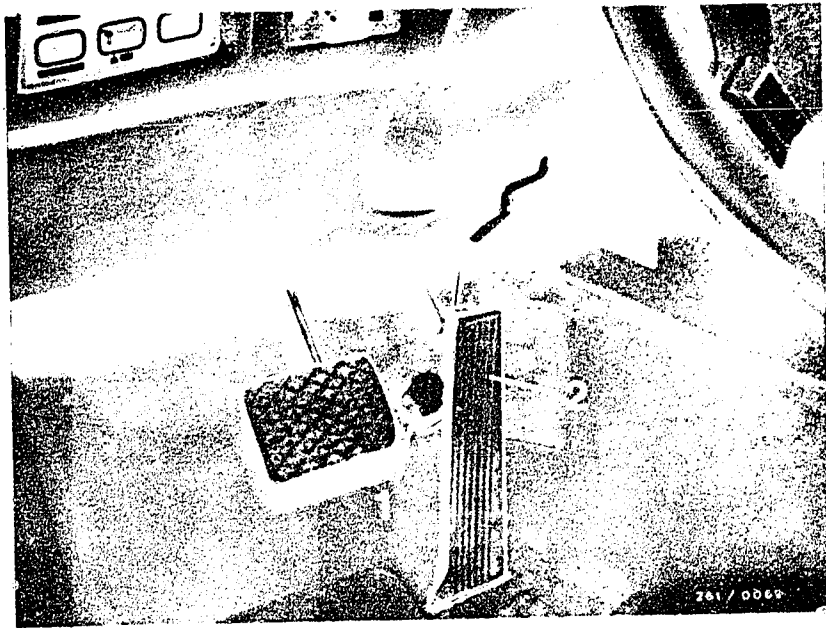
Trouble-shooting:

- Test lead to Term. 3 for continuity. Contact O.K.?
- Test kick-down switch and its ground connection.



Top view of 35-pin
multiple plug of
transmission wiring harness

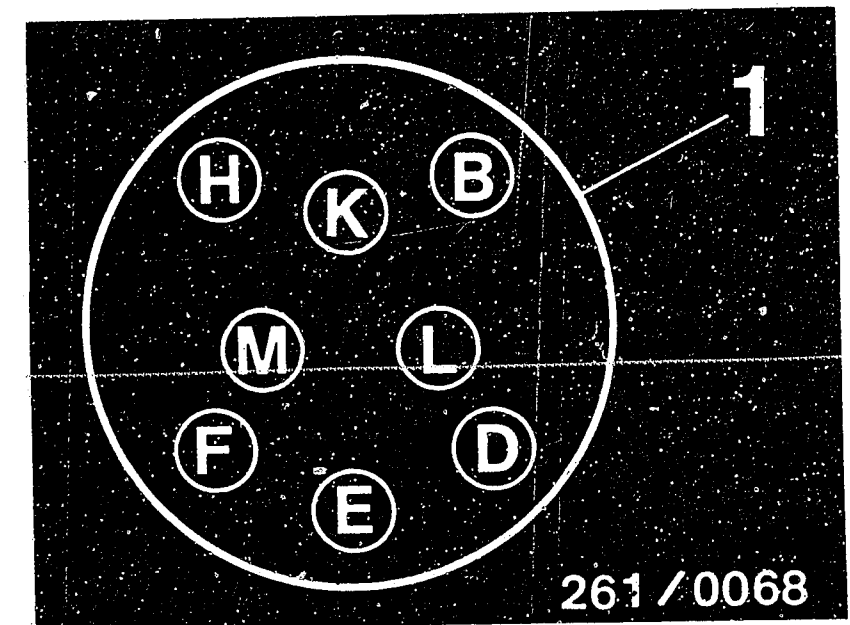
1 = Kick-down switch
2 = Accelerator



TEST STEP 11		
Operation:	Reading:	Testing:
<u>Program switch "V" at position</u> <div style="text-align: center;">↓</div>	On multimeter: 25...65 Ω	<u>Component:</u> Solenoid-operated valve MV1 in transmission
<u>Program switch "Ω" at position</u> <div style="text-align: center;">16</div>		<u>Operation:</u> Winding resistance between Term. 5 and Term. 18
<u>Measuring equipment:</u> Ohmmeter		<u>Malfunction:</u> Resistance outside tolerance
<u>Measuring range:</u> 0 to 10 k Ω		
<u>Connection:</u> Test sockets Ω		
<u>Operation in vehicle:</u> Switch off ignition Selector switch in position P	If reading O.K., <u>continue testing with next test step.</u>	

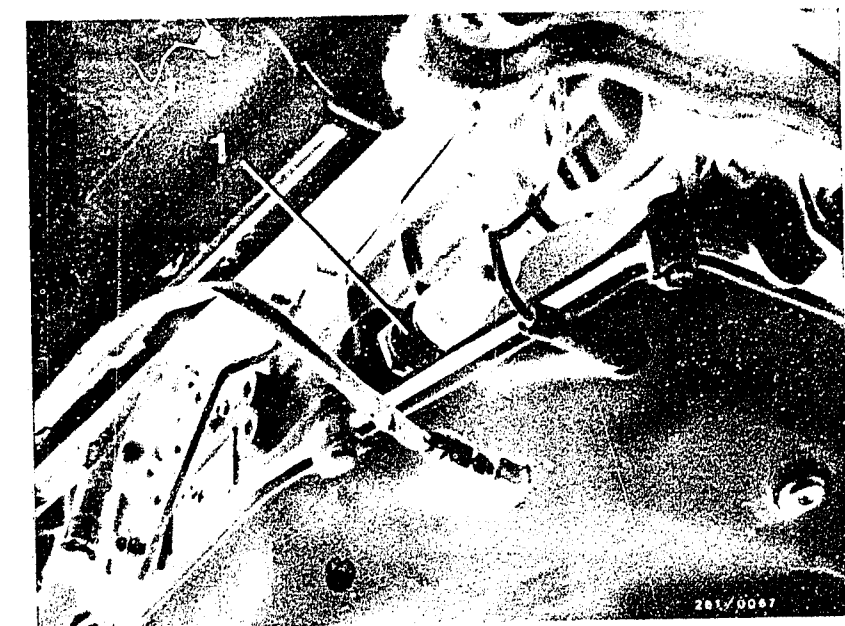
Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
 - Measure winding resistance directly at plug section on transmission between terminals H and M for solenoid-operated valve MV1.
- Resistance outside tolerance: Replace transmission
 Resistance correct: Test leads to Term. 5 and Term. 18 for continuity.



1 = Top view of plug part on transmission

1 = Plug connector on transmission



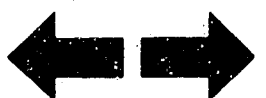
C13

Test with universal test adapter
 Electronic transmission control BMW

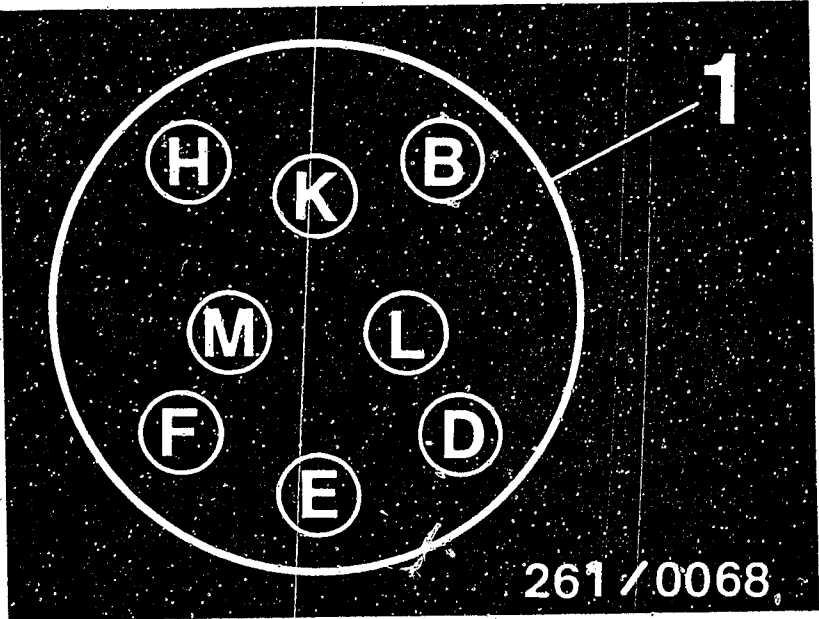


C14

Test with universal test adapter
 Electronic transmission control BMW

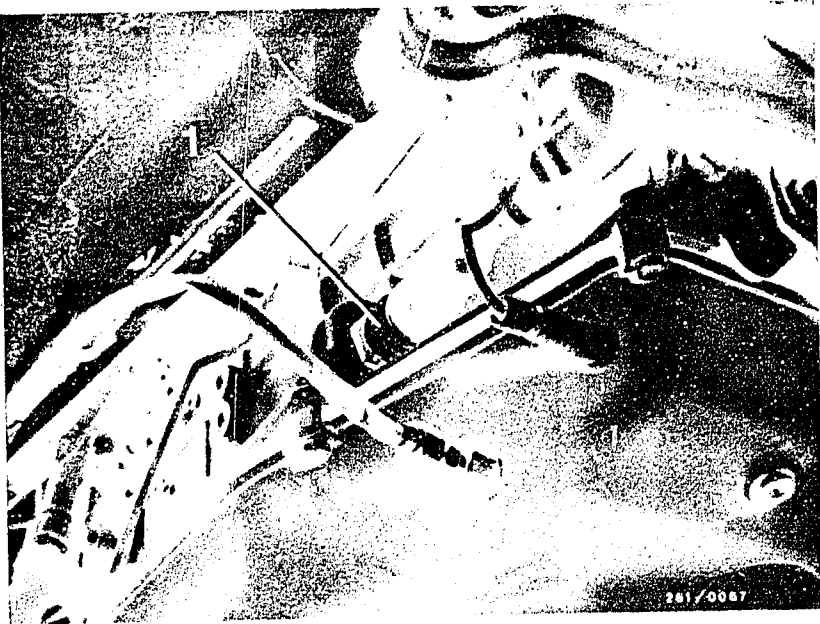


TEST STEP 12			
Operation:		Reading:	Testing:
Program switch "V" at position	↓	On multimeter: <u>25...65 Ω</u>	Component: Solenoid-operated valve MV2 in transmission
Program switch "Ω" at position	17		Operation: Winding resistance between Term. 6 and Term. 18
Measuring equipment Ohmmeter			Malfunction: Resistance outside tolerance
Measuring range: 0 to 10 k Ω			
Connection: Test sockets	Ω	If reading O.K., continue testing with <u>next test step</u>	
Operation in vehicle: Switch off ignition Selector switch in position P			




1 = Top view of plug part on transmission

1 = Plug connector on transmission



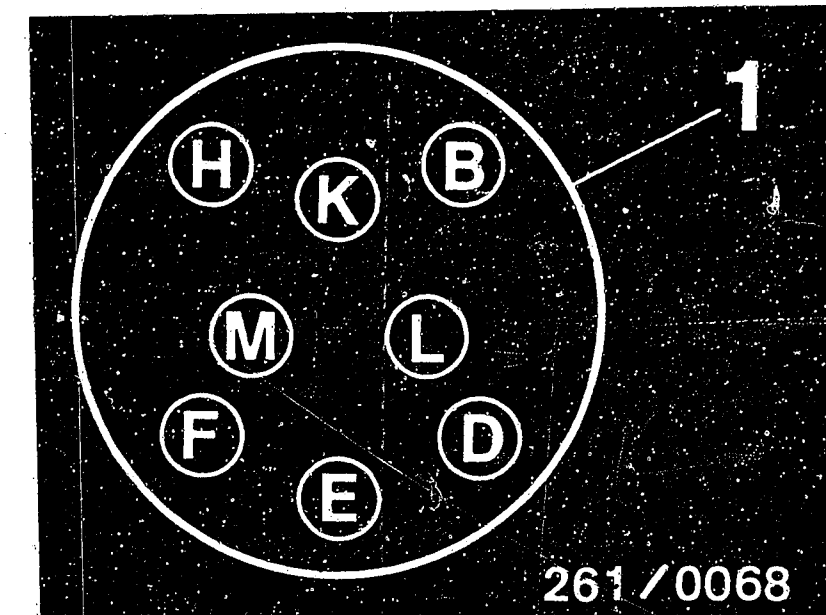
Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
- Measure winding resistance correctly at plug section on transmission between terminals K and M for solenoid-operated valve MV2.
Resistance outside tolerance: Replace transmission.
Resistance correct: Test lead to Term. 6 for continuity.

TEST STEP 13			
<u>Operation:</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u>		On multimeter: <u>25...65 Ω</u> 	

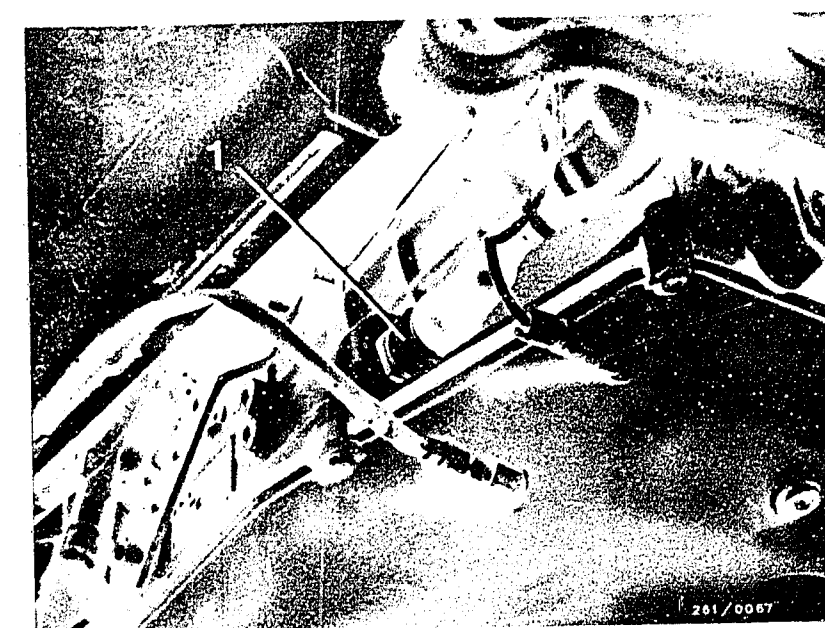
Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
 - Measure winding resistance directly at plug section on transmission between terminals D and M for reverse gear lock solenoid-operated valve.
- Resistance outside tolerance: Replace transmission.
Resistance correct: Test lead to Term. 7 for continuity.



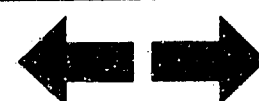
1 = Top view of plug part on transmission

1 = Plug connector on transmission



C17

Test with universal test adapter
Electronic transmission control BMW

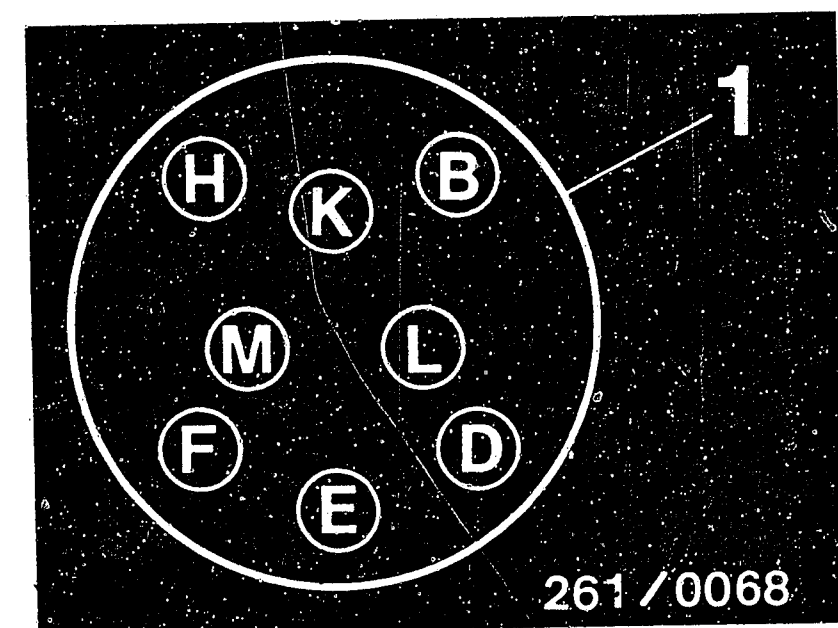


C18

Test with universal test adapter
Electronic transmission control BMW

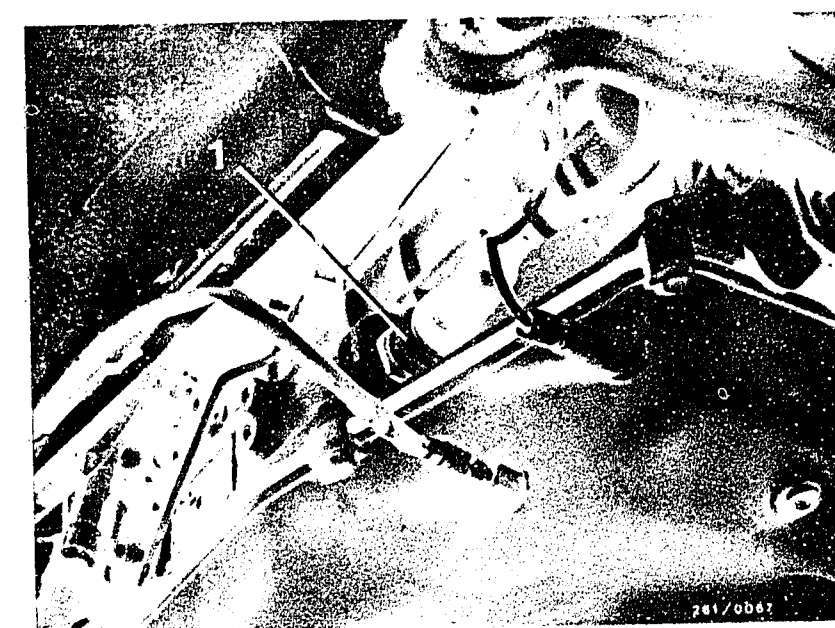


TEST STEP 14			
Operation:		Reading:	Testing:
Program switch "V" at position	↓	On multimeter: 25...65 Ω	Component: Solenoid-operated valve for converter clutch
Program switch "Ω" at position	19		
Measuring equipment: Ohmmeter			Operation: Winding resistance between Term. 17 and Term. 18
Measuring range: 0 to 10 kΩ		If reading O.K., continue testing with <u>next test step</u>	Malfunction: Resistance outside tolerance
Connection: Test sockets	Ω		
Operation in vehicle: Switch off ignition Selector switch in position P			



1 = Top view of plug part on transmission

1 = Plug connector on transmission



Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
- Measure winding resistance directly at plug section on transmission between terminals L and M for converter clutch solenoid-operated valve.
Resistance outside tolerance: Replace transmission.
Resistance correct: Test lead to Term. 17 for continuity.

C19

Test with universal test adapter
Electronic transmission control BMW



C20

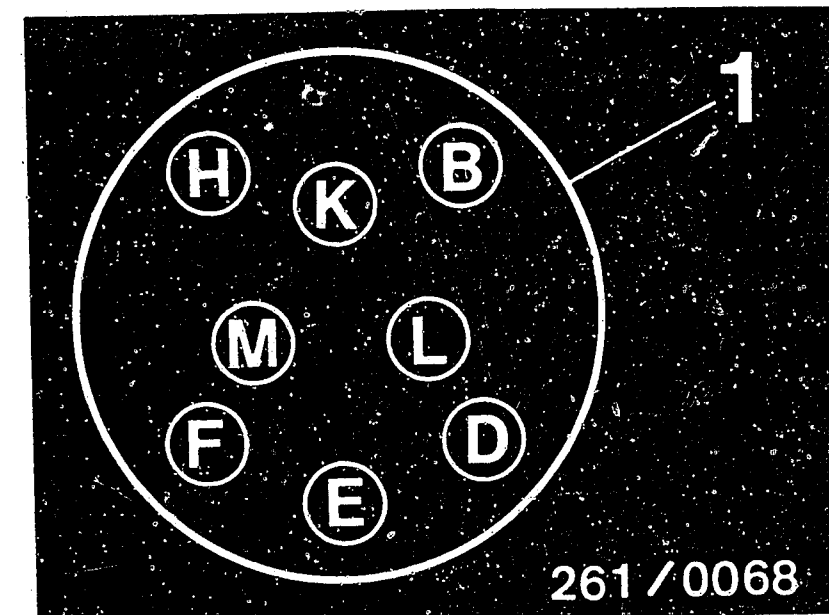
Test with universal test adapter
Electronic transmission control BMW



TEST STEP 15		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	↓	On multimeter: <u>4.5 ... 9 Ω</u>	<u>Component:</u> Pressure regulator in transmission
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Ohmmeter			<u>Operation:</u> Winding resistance between Term. 2 and Term. 18
<u>Measuring range:</u> 0 to 10 kΩ			
<u>Connection:</u> Test sockets	Ω		<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position P		If reading O.K., continue testing with <u>next test step.</u>	

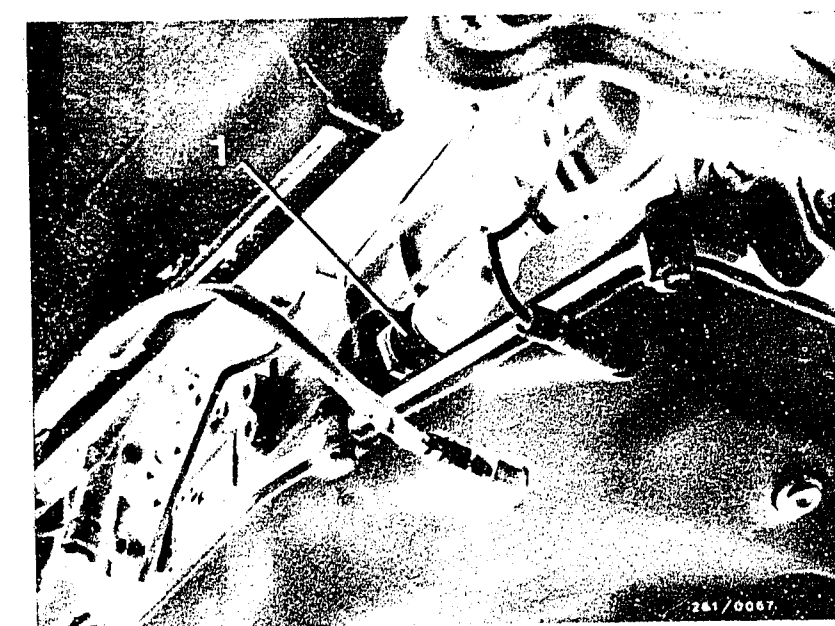
Trouble-shooting:

- Check plug-in connections for corrosion and good contact.
 - Measure winding resistance directly at plug section on transmission between terminals B and M for pressure regulator.
- Resistance outside tolerance: Replace transmission.
Resistance correct: Test lead to Term. 2 for continuity.



1 = Top view of plug part on transmission

1 = Plug connector on transmission



C21

Test with universal test adapter
Electronic transmission control BMW

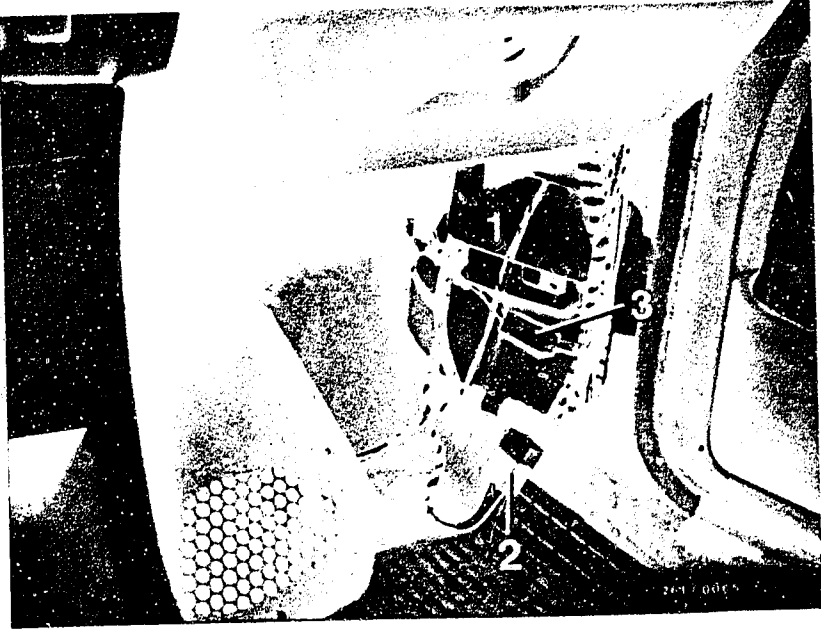


C22

Test with universal test adapter
Electronic transmission control BMW

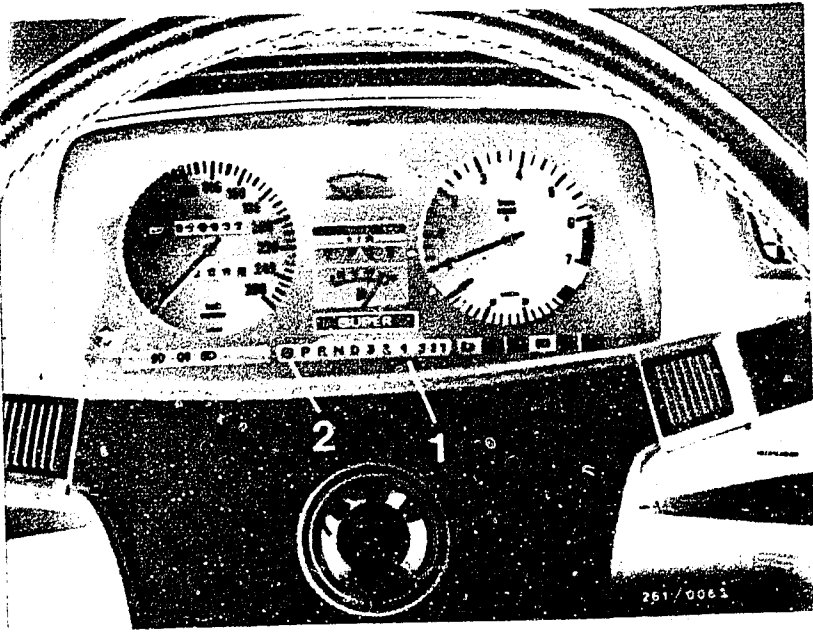


TEST STEP 16		Reading:	Testing:
Operation:			
<u>Program switch "V" at position</u>	3	On multimeter: 1. <u>10...15 V</u> 2. Warning lamp for transmission control lights up If reading O.K., continue testing with <u>next test step.</u>	<u>Component:</u> 1. Relay 2 (main relay of Motronic) 2. Relay for transmission, warning lamp
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> 1. Power supply for transmission control (Term. 10 to Term. 22, ground) 2. Break contact; Bulb for warning lamp
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V		
<u>Buttons must not be pressed.</u>		<u>Malfunction:</u> 1. Voltage less than 10 V 2. Warning lamp does not light up	
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position P			



1 = Control unit
2 = Transmission relay
3 = 4-pin plug connector

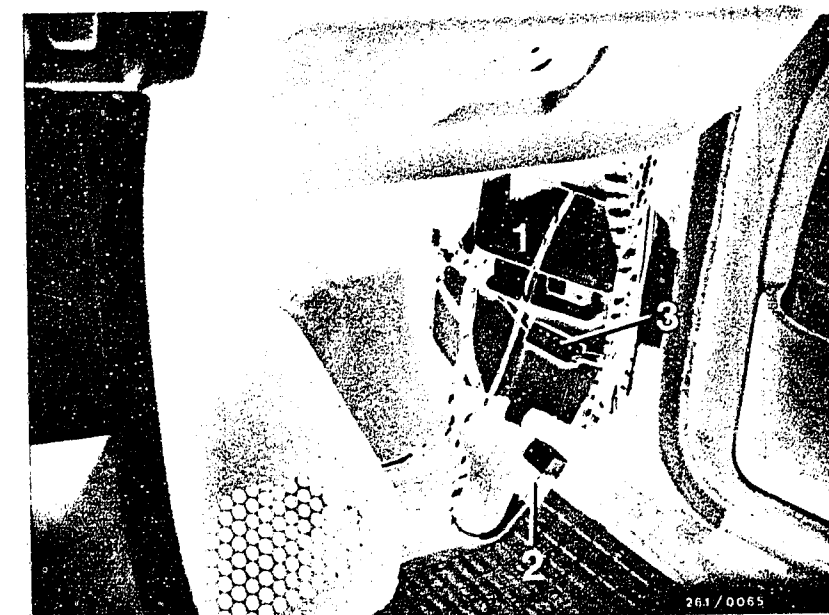
1 = Indicator unit
2 = Warning lamp for electronic transmission control



Trouble-shooting:

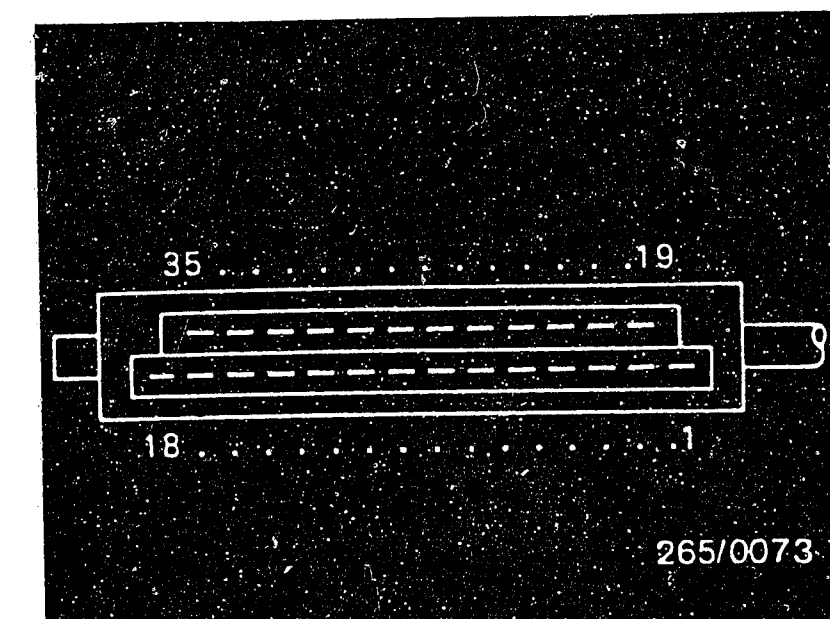
- For 1.
- Test lead including plug-in connections from multiple plug Term. 10 to relay 2 Term. 87.
 - Replace relay 2.
- For 2.
- Replace relay for transmission
 - Replace bulb for warning lamp
 - Test leads including plug-in connections from control unit Term. 10 to relay for transmission Term. 30, as well as from Term.87a to warning lamp.
 - Test ground lead of warning lamp.

TEST STEP 17		Reading:	Testing:
Operation:			
Program switch "V" at position	4	On multimeter 1. 10...15 V 2. Warning lamp for transmission control goes out	Component: Relay for transmission control
Program switch "Ω" at position	20		
Measuring equipment: Voltmeter			Operation: Relay coil (Term. 19 to ground), make contact (Term. 18 to Term. 22, ground)
Measuring range: 15 V			
Connection: Test sockets (red = +, black = ground)	V		
Press button	T3		Malfunction: Voltage less than 10 V, Warning lamp does not go out
Operation in vehicle: Switch on ignition Selector switch in position P		If reading O.K., continue testing with <u>next test step.</u>	



1 = Control unit
 2 = Transmission relay
 3 = 4-pin plug connector

Top view of 35-pin
 multiple plug of trans-
 mission wiring harness



265/0073

Trouble-shooting:

- Replace relay for transmission control
- Test following leads including plug-in connections:
 From multiple plug Term. 19 to relay Term. 86, from
 multiple plug Term. 10 to relay Term. 85, from multiple
 plug Term. 18 to relay Term. 87

D1

Test with universal test adapter
 Electronic transmission control BMW

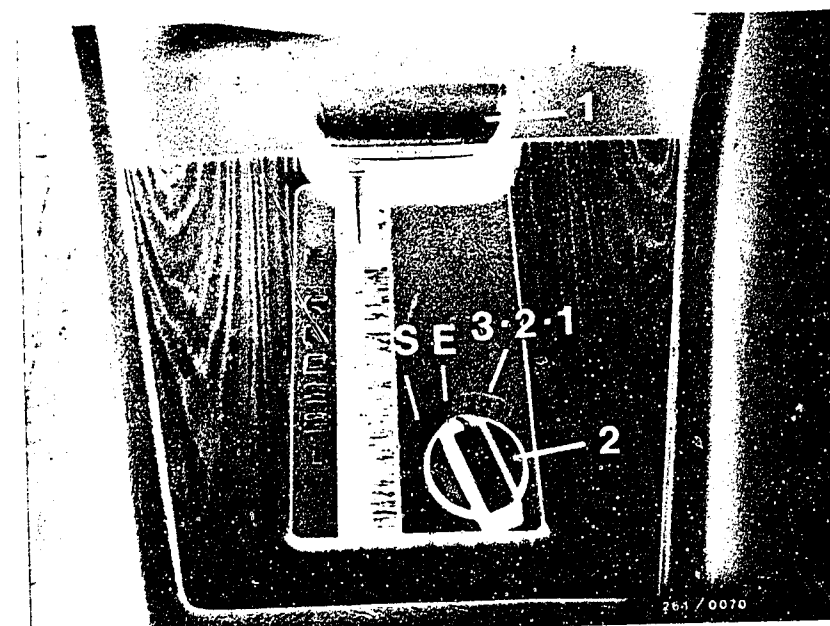


D2

Test with universal test adapter
 Electronic transmission control BMW

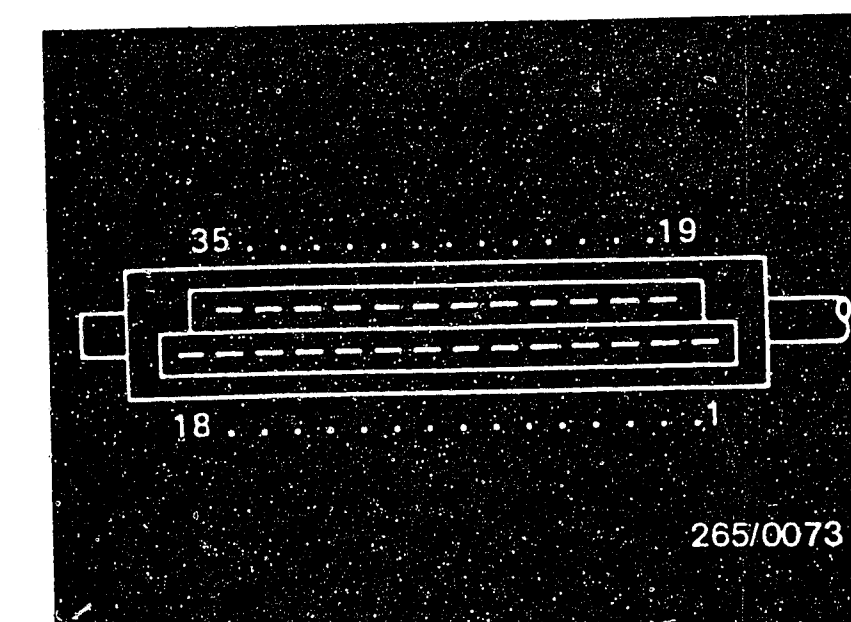


TEST STEP 18		Reading:	Testing:
Operation:			
Program switch "V" at position	5	On multimeter: 1. <u>Greater than 6 V</u> 2. Gear indicator 1 lights up	<u>Component:</u> 1. Selector switch 2. Indicator unit
Program switch "Ω" at position	20		
Measuring equipment: Voltmeter			<u>Operation:</u> 1. Voltage between Term. 12 and Term. 22 (ground). 2. Gear indicator 1
Measuring range: 15 V			
Connection: Test sockets (red = +, black = ground)	V	If reading O.K., <u>continue testing with next test step</u>	<u>Malfunction:</u> 1. Voltage less than 6 V 2. Gear indicator 1 does not light up
Operation in vehicle: Switch on ignition Selector switch in position 1			



1 = Selector switch
2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



Trouble-shooting:

No voltage reading and no gear indicator: Test fuse No. 17 and positive lead to selector switch Term. 3.

For 1.

- Test lead including plug-in connection from multiple plug Term. 12 to selector switch Term. 9
- Set selector switch or selector switch defective

For 2.

- Test lead including plug-in connection from control unit Term. 12 to indicator unit Term. 11.
- Test gear indicator 1 (bulb 1, diode, power supply).

D3

Test with universal test adapter
Electronic transmission control BMW

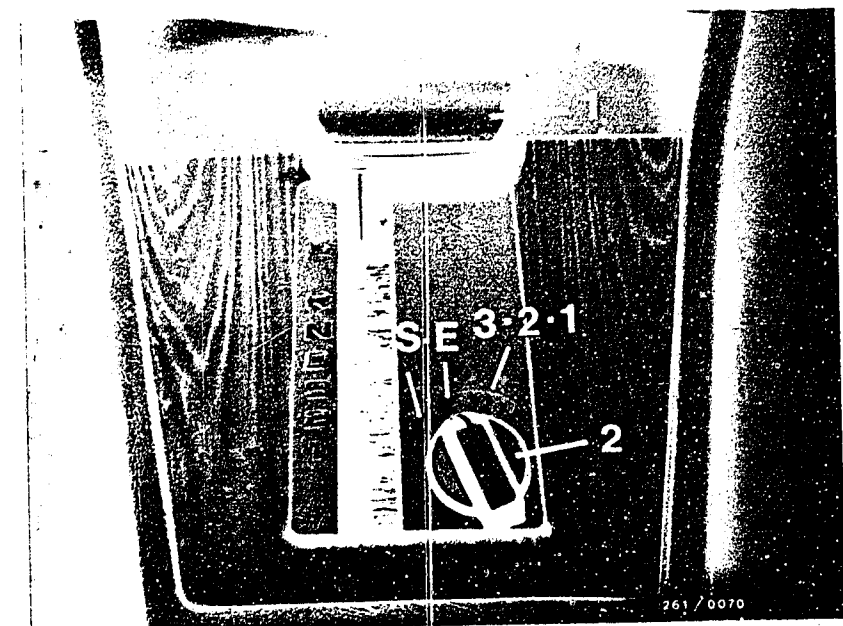


D4

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 19		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	5	On multimeter: 1. <u>Less than 1 V</u> 2. Gear indicator 2 lights up If reading O.K., continue testing with <u>next test step</u> .	<u>Component:</u> 1. Selector switch 2. Indicator unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> 1. Voltage between Term. 12 and Term. 22 (ground) 2. Gear indicator
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V		<u>Malfunction:</u> 1. Voltage greater than 1 V 2. Gear indicator does not light up
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position 2			



1 = Selector switch
2 = Program switch

Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 8 to indicator unit Term. 10.
- Test gear indicator 2 (bulb 2, diode, power supply).

D5

Test with universal test adapter
Electronic transmission control BMW



D6

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 20

Operation:

Program switch "V" at position

6

Program switch "Ω" at position

20

Measuring equipment:

Voltmeter

Measuring range:

15 V

Connection: Test sockets
(red = +, black = ground)

V

Operation in vehicle:

Switch on ignition
Selector switch in position 2

Reading:

On multimeter:

Greater than 6 V

Note:

Gear indicator 2 still lit.

If reading O.K.,
continue testing with
next test step.

Testing:

Component:

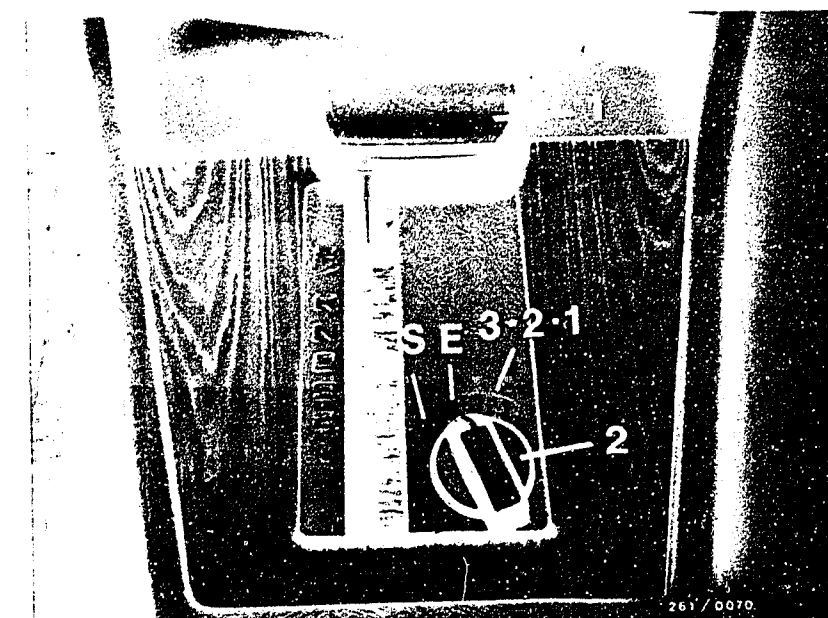
Selector switch

Operation:

Voltage between Term. 13 and
Term. 22 (ground)

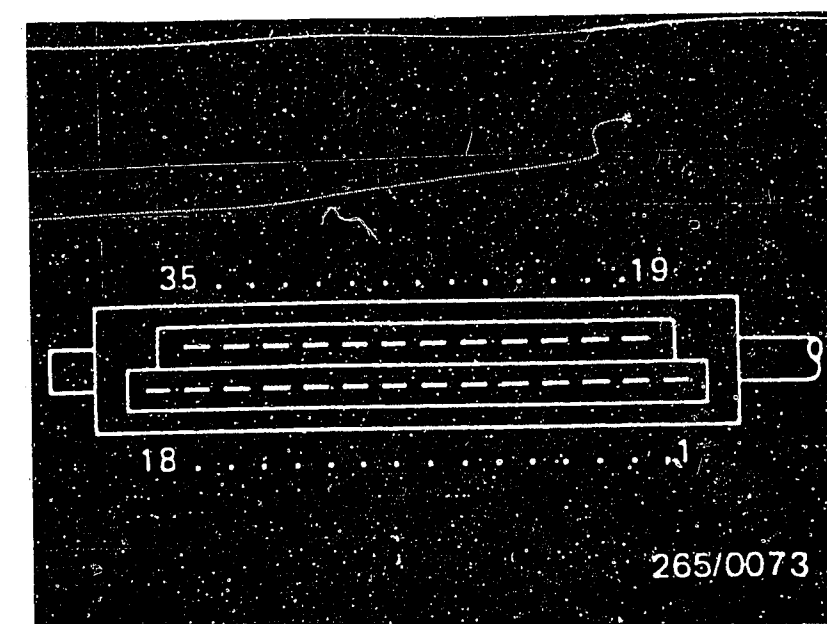
Malfunction:

Voltage less than 6 V



1 = Selector switch
2 = Program switch

Top view of 35-pin multiple
plug of transmission wiring
harness



265/0073

Trouble-shooting:

- Test lead including plug-in connection from multiple plug
Term. 13 to selector switch Term. 8.

D7

Test with universal test adapter
Electronic transmission control BMW



D8

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 21

Operation:

Program switch "V" at position

6

Program switch "Ω" at position

20

Measuring equipment:

Voltmeter

Measuring range:

15 V

Connection: Test sockets
(red = +, black = ground)

V

Operation in vehicle:

Switch on ignition
Selector switch in position 3

Reading:

On multimeter:

1.

Less than 1 V

2. Gear indicator
3 lights up

If reading O.K.,
continue testing
with next test step.

Testing:

Component:

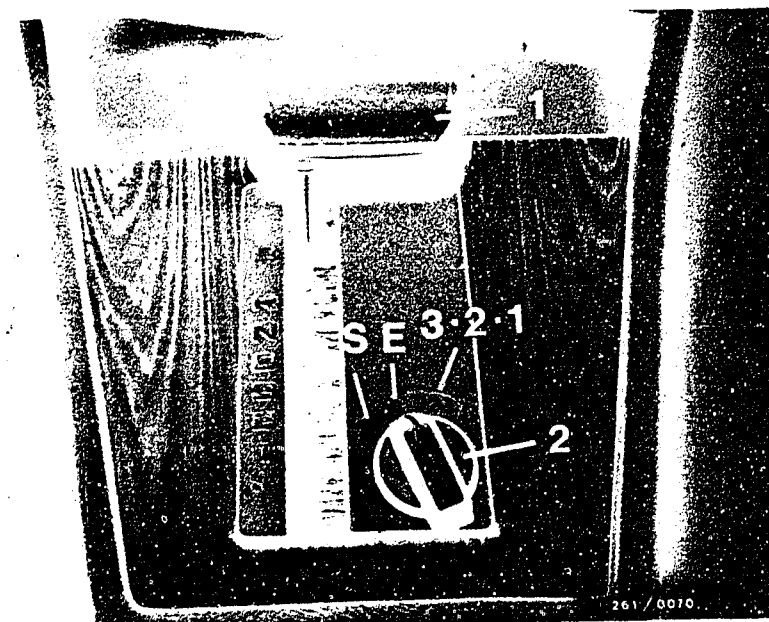
1. Selector switch
2. Indicator unit

Operation:

1. Voltage between Term. 13
and Term. 22 (ground).
2. Gear indicator

Malfunction:

1. Voltage greater than 1 V
2. Gear indicator does not
light up



1 = Selector switch
2 = Program switch

Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch pin 3 to indicator unit Term. 9
- Test gear indicator 3 (bulb 3, diode, power supply).

D9

Test with universal test adapter
Electronic transmission control BMW



D10

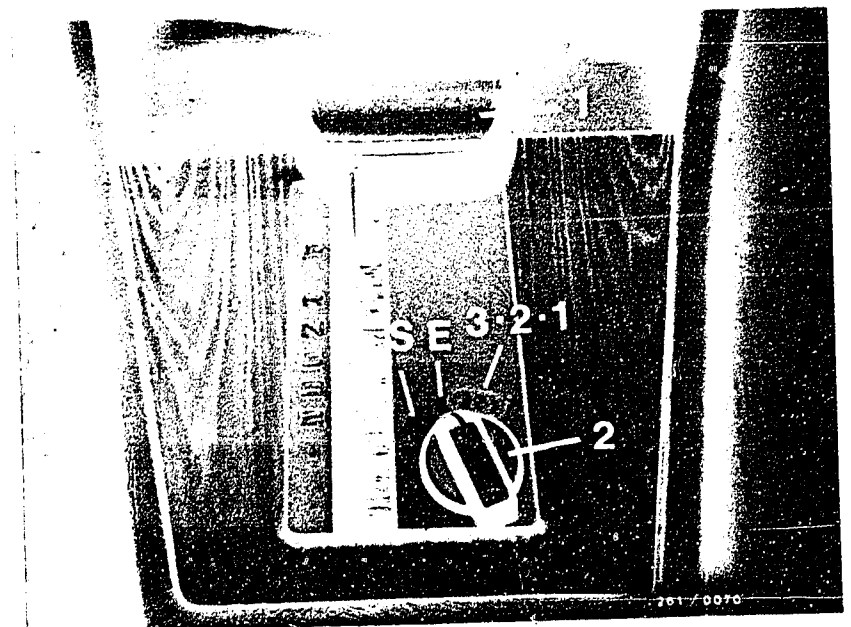
Test with universal test adapter
Electronic transmission control BMW



TEST STEP 22			
Operation:		Reading:	Testing:
Program switch "V" at position	7	On multimeter: Greater than 6 V Note: Gear indicator 3 still lit.	Component: Selector switch
Program switch "Ω" at position	20		
Measuring equipment: Voltmeter			Operation: Voltage between Term. 28 and Term. 22 (ground)
Measuring range: 15 V			
Connection: Test sockets (red = +, black = ground)	V		Malfunction: Voltage less than 6 V
Operation in vehicle: Switch on ignition Selector switch in position 3		If reading O.K., continue testing with next test step.	

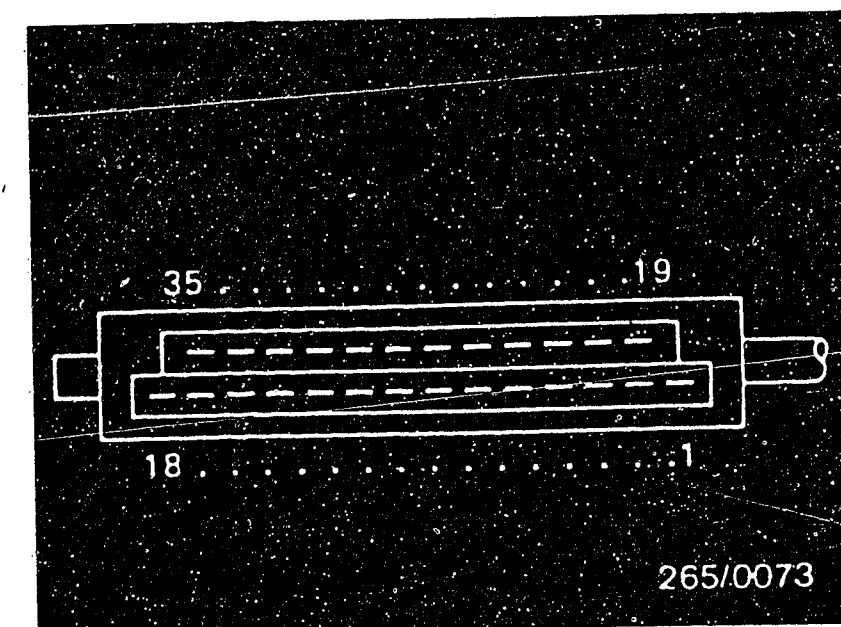
Trouble-shooting:

- Test lead including plug-in connection from multiple plug Term. 28 to selector switch pin 3.



1 = Selector switch
2 = Program switch

Top view of 35-pin
multiple plug of trans-
mission wiring harness



265/0073

D11

Test with universal test adapter
Electronic transmission control BMW



D12

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 23

Operation:

Program switch "V" at position

7

Program switch "Ω" at position

20

Measuring equipment:

Voltmeter

Measuring range:

15 V

Connection: Test sockets
(red = +, black = ground)

V

Operation in vehicle:

Switch on ignition
Selector switch in position D

Reading:

On multimeter:

Less than 1 V

2. Gear indicator D
lights up

If reading O.K.,
continue testing with
next test step.

Testing:

Component:

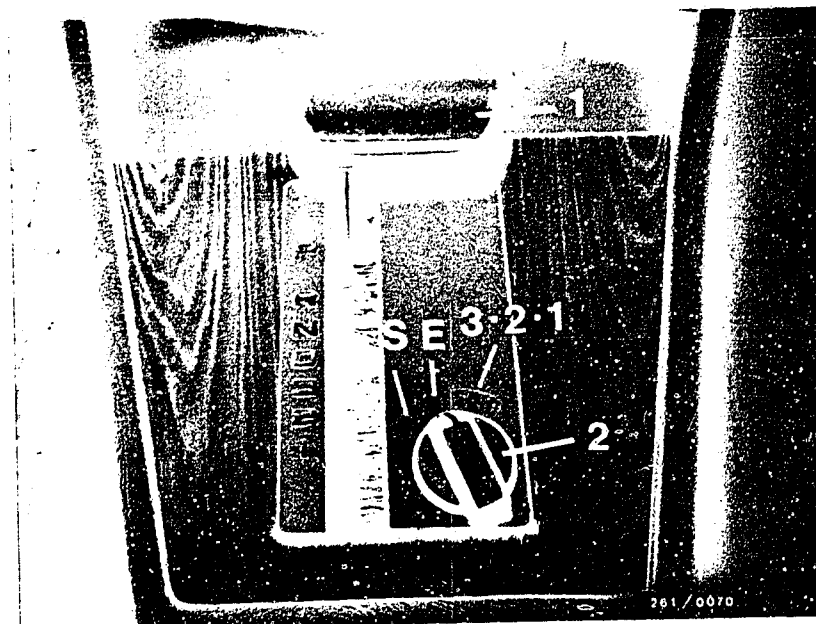
1. Selector switch
2. Indicator unit

Operation:

1. Voltage between Term. 28 and
Term. 22 (ground)
2. Gear indicator

Malfunction:

1. Voltage greater than 1 V
2. Gear indicator does not
light up



1 = Selector switch
2 = Program switch

Trouble-shooting :

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch
Term. 7 to indicator unit Term. 8.
- Test gear indicator D (bulb D, diode, power supply).

D13

Test with universal test adapter
Electronic transmission control BMW

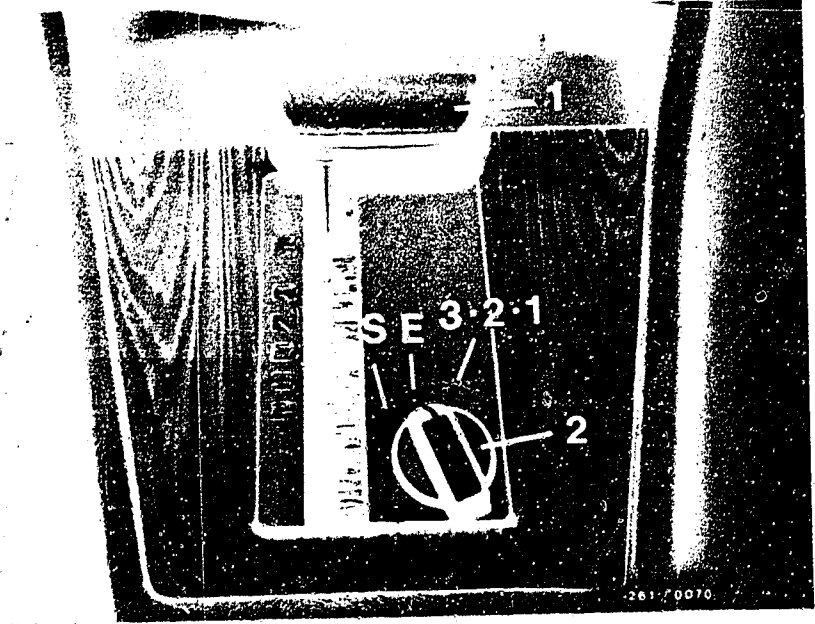


D14

Test with universal test adapter
Electronic transmission control BMW

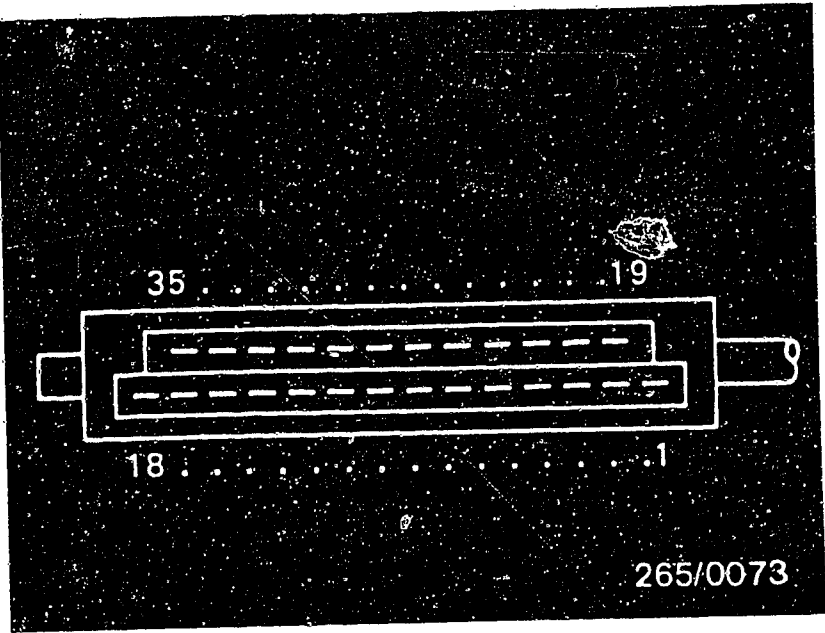


TEST STEP 24		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	8	On multimeter: <u>Greater than 6 V</u> <u>Note:</u> Gear indicator D still lit.	<u>Component:</u> Selector switch
<u>Program switch "N" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage between Term. 29 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
<u>Connection:</u> Test sockets (red = +, black = ground)	V		<u>Malfunction:</u> Voltage less than 6 V
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position D		If reading O.K., continue testing with <u>next test step.</u>	



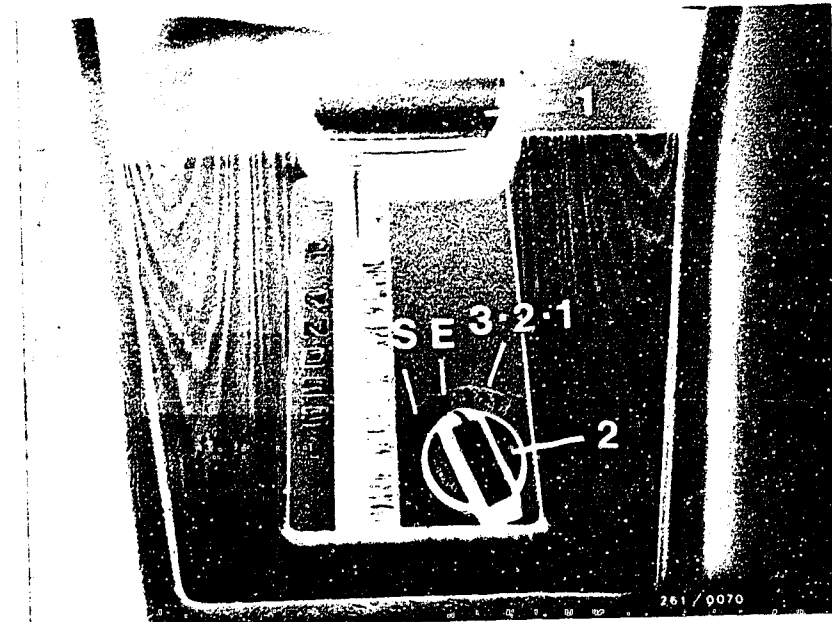
1 = Selector switch
2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



265/0073

TEST STEP 25		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	8	On multimeter: 1. <u>Less than 1 V</u> 2. Gear indicator N lights up	<u>Component:</u> 1. Selector switch 2. Indicator unit
<u>Program switch "N" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> 1. Voltage between Term. 29 and Term. 22 (ground) 2. Gear indicator
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V	If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u> 1. Voltage greater than 1 V 2. Gear indicator does not light up
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position N			



1 = Selector switch
2 = Program switch

Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 6 to indicator unit Term. 6.
- Test gear indicator N (bulb N, diode, power supply).

D17

Test with universal test adapter
Electronic transmission control BMW



D18

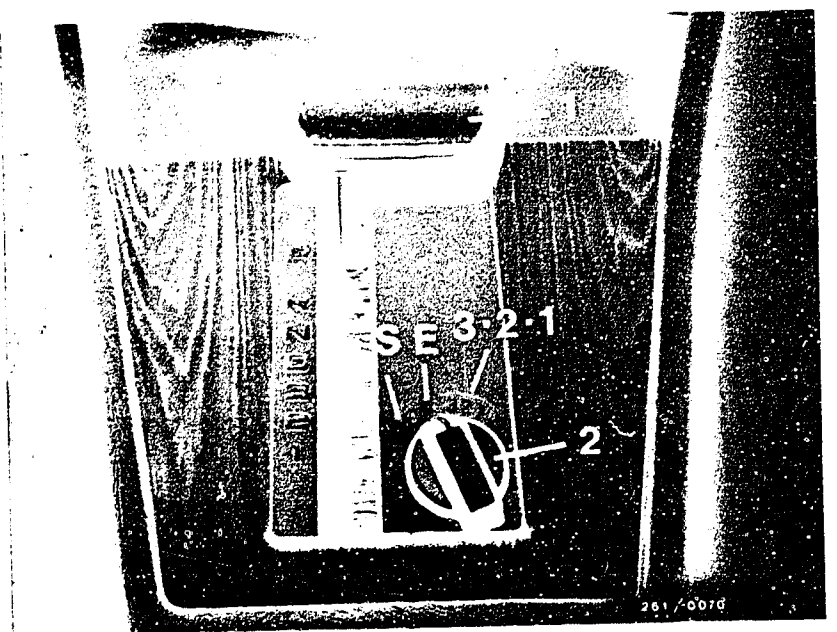
Test with universal test adapter
Electronic transmission control BMW



<u>TEST STEP 26</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Operation:</u>			
<u>Program switch "V" at position</u>	9	On multimeter <u>Greater than 6 V</u>	<u>Component:</u> Selector switch
<u>Program switch "Ω" at position</u>	20	<u>Note:</u> Gear indicator N still lit	
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage between Term. 30 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets (red = +, black = ground)</u>	V		
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position N		If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u> Voltage less than 6 V

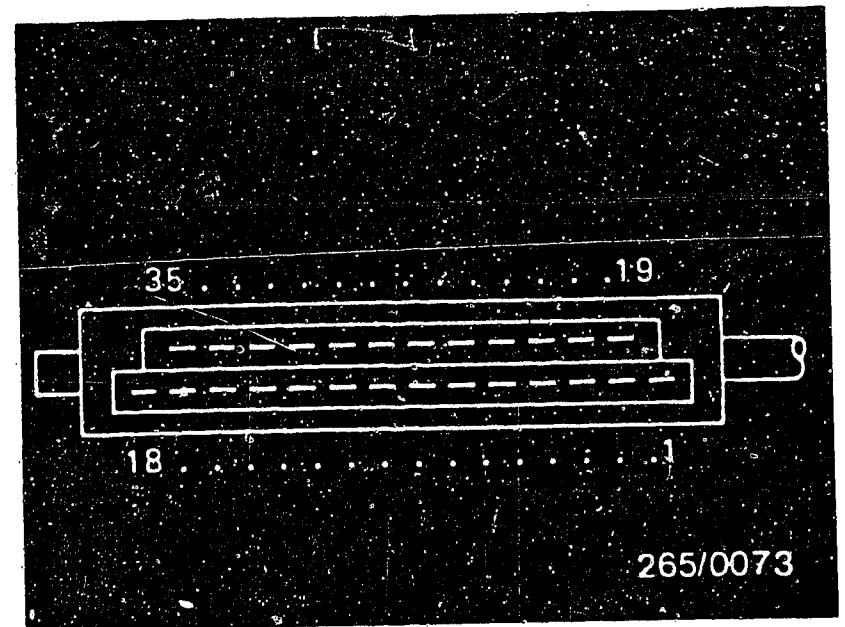
Trouble-shooting:

- Test lead including plug-in connection from multiple plug Term. 30 to selector switch Term. 6.



- 1 = Selector switch
- 2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



D19

Test with universal test adapter
Electronic transmission control BMW

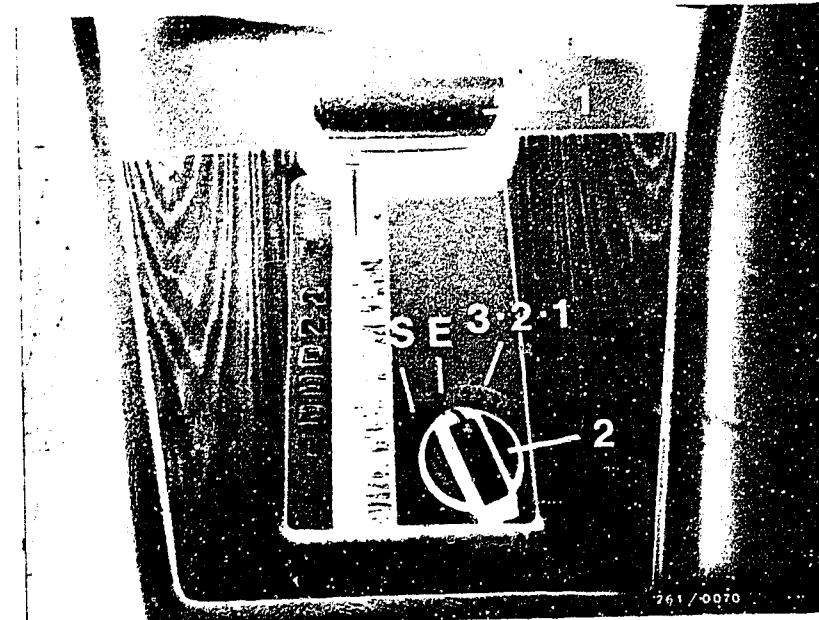


D20

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 27		Reading:	Testing:
Operation:			
<u>Program switch "V" in position</u>	9	On multimeter 1. <u>Less than 1 V</u> 2. Gear indicator R lights up If reading O.K., continue testing with <u>next test step.</u>	<u>Component:</u> 1. Selector switch 2. Indicator unit
<u>Program witch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position R			<u>Malfunction:</u> 1. Voltage greater than 1 V 2. Gear indicator does not light up



1 = Selector switch
2 = Program switch

Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 5 to indicator unit Term. 5.
- Test gear indicator R (bulb R, Diode, power supply).

D21

Test with universal test adapter
Electronic transmission control BMW

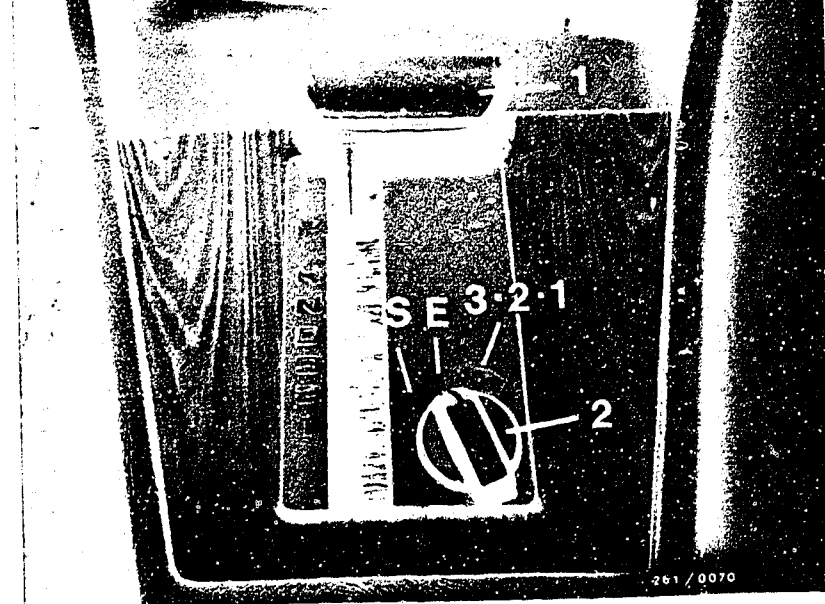


D22

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 28		Reading:	Testing:
Operation:			
Program switch "V" at position	9	On multimeter: 1. <u>Less than 1 V</u> 2. Gear indicator P lights up 	



1 = Selector switch
2 = Program switch

Trouble-shooting:

For 1.

- Selector switch defective

For 2.

- Test lead including plug-in connection from selector switch Term. 4 to indicator unit Term. 4
- Test gear indicator P (bulb P, power supply).

D23

Test with universal test adapter
Electronic transmission control BMW

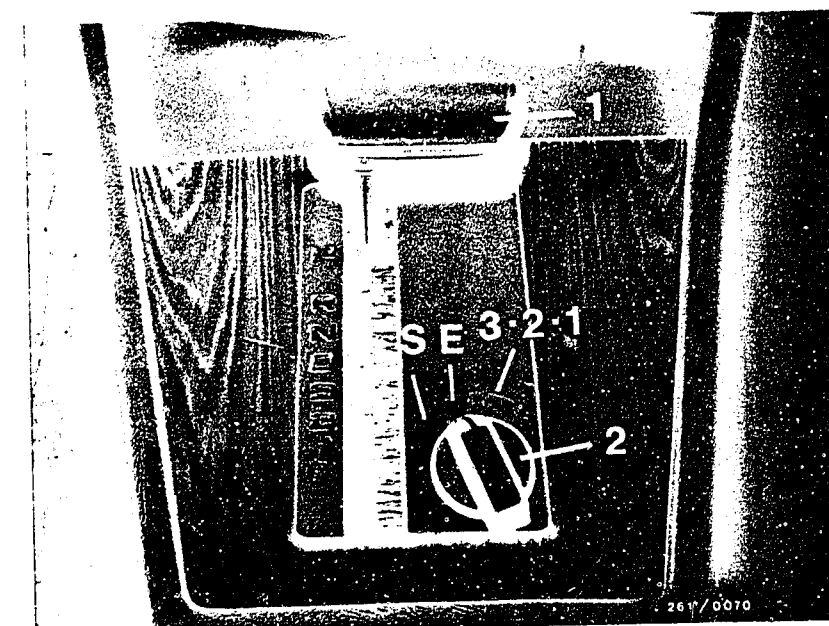


D24

Test with universal test adapter
Electronic transmission control BMW

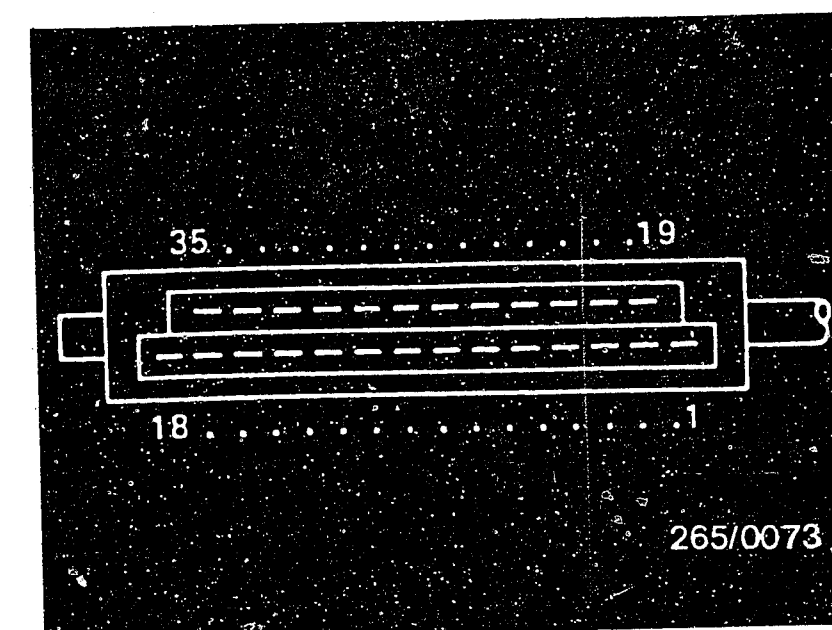


<u>TEST STEP 29</u>		<u>Reading:</u>	<u>Testing:</u>
<u>Operation:</u>			
<u>Program switch "V" at position</u>	10	On multimeter: <u>Greater than 4 V</u>	<u>Component:</u> Program switch
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage between Term. 34 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			
<u>Component:</u> Test sockets (red = +, black = ground)	V		<u>Malfunction:</u> Voltage less than 4 V
<u>Operation in vehicle:</u> Switch on ignition Selector switch in position P Program switch in position E		If reading O.K., continue testing with <u>next test step.</u>	



1 = Selector switch
2 = Program switch

Top view of 35-pin
multiple plug of trans-
mission wiring harness



Trouble-shooting:

- Test lead including plug-in connection from multiple plug Term. 34 to program switch Term. 3.2.1 and to indicator unit Term. 3.
- Test positive lead to indicator unit Term. 12
- Test electronics for gear indicator 3.2.1.
- Program switch is defective

E1

Test with universal test adapter
Electronic transmission control BMW

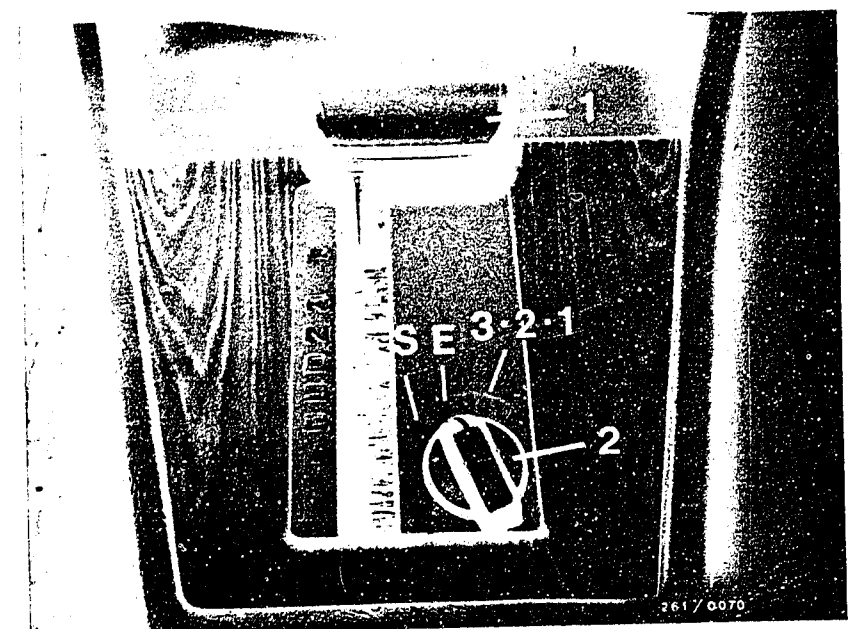


E2

Test with universal test adapter
Electronic transmission control BMW

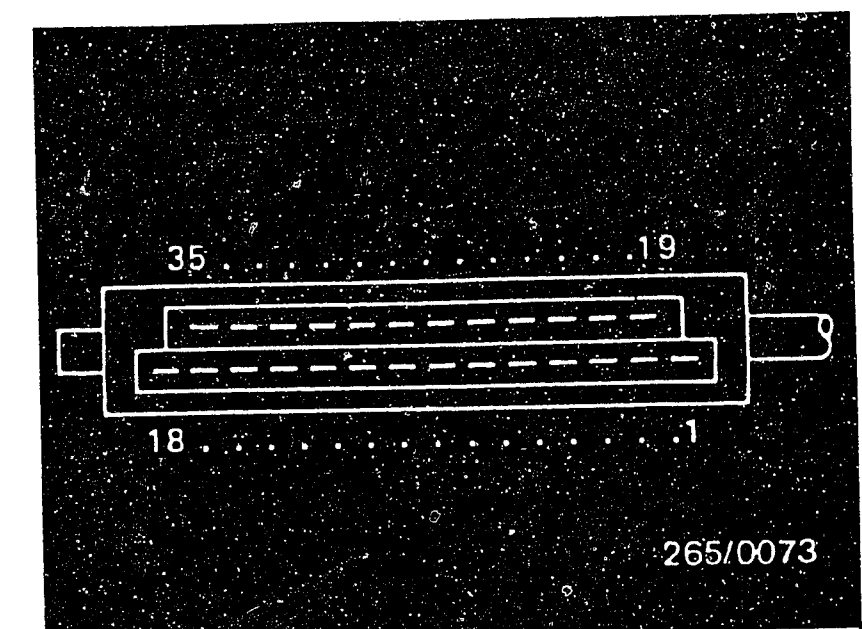


TEST STEP 30		Reading:	Testing:
Operation:			
<u>Program switch "V" at position</u>	10	On multimeter: 1. <u>Less than 0.8 V</u> 2. Gear indicator 3.2.1 lights up. 	



1 = Selector switch
2 = Program switch

Top view of 35-pin multiple plug of transmission wiring harness



Trouble-shooting:

For 1.

- Program switch defective

For 2.

- Bulb for gear indicator 3.2.1 defective
- Electronics for gear indicator 3.2.1 defective

E3

Test with universal test adapter
Electronic transmission control BMW

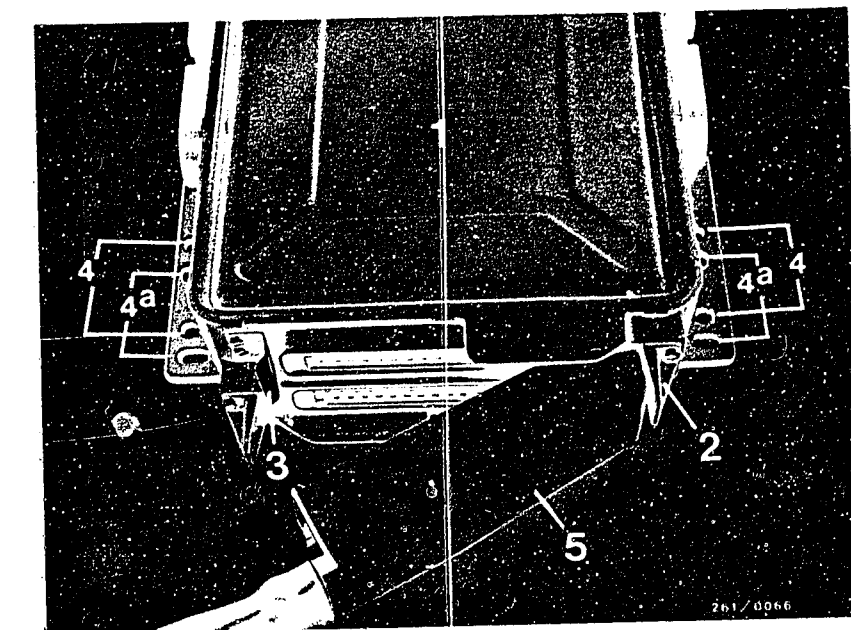


E4

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 31, Switch off ignition and connect control unit.			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>	11	On multimeter: <u>10...15 V</u>	<u>Component:</u> Control unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Output stage for solenoid-operated valve of converter clutch. Voltage between Term. 17 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V	If reading O.K., continue testing with <u>next test step</u> .	<u>Malfunction:</u> Voltage less than 10 V
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.			



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

F1

E5

Test with universal test adapter
Electronic transmission control BMW

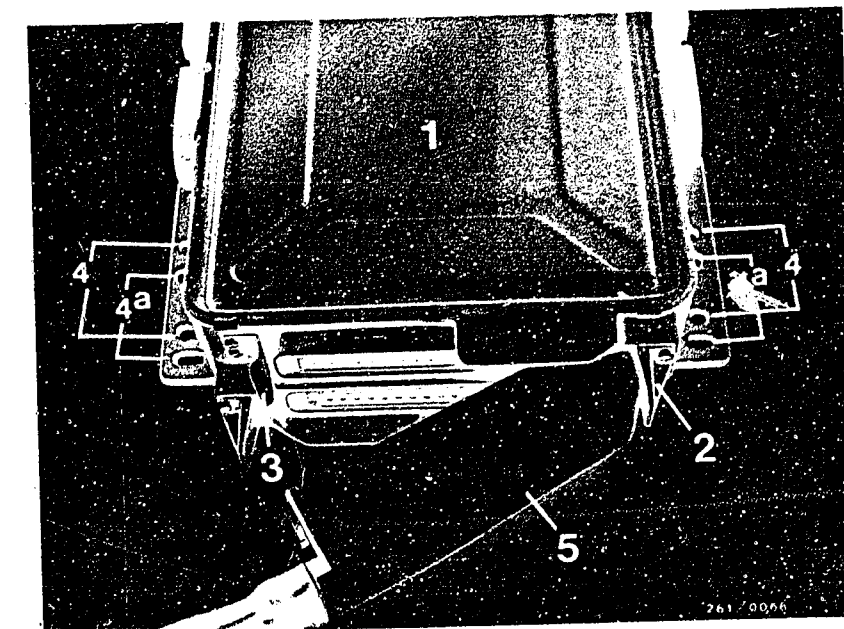


E6

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 32		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	12	On multimeter: <u>10...15 V</u>	<u>Component:</u> Control unit
<u>Program switch "N" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Output stage for solenoid-operated valve of reverse gear lock Voltage between Term. 7 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			
<u>Connection:</u> Test sockets (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.		If reading O.K., continue testing with <u>next test step</u> .	<u>Malfunction:</u> Voltage less than 10 V



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

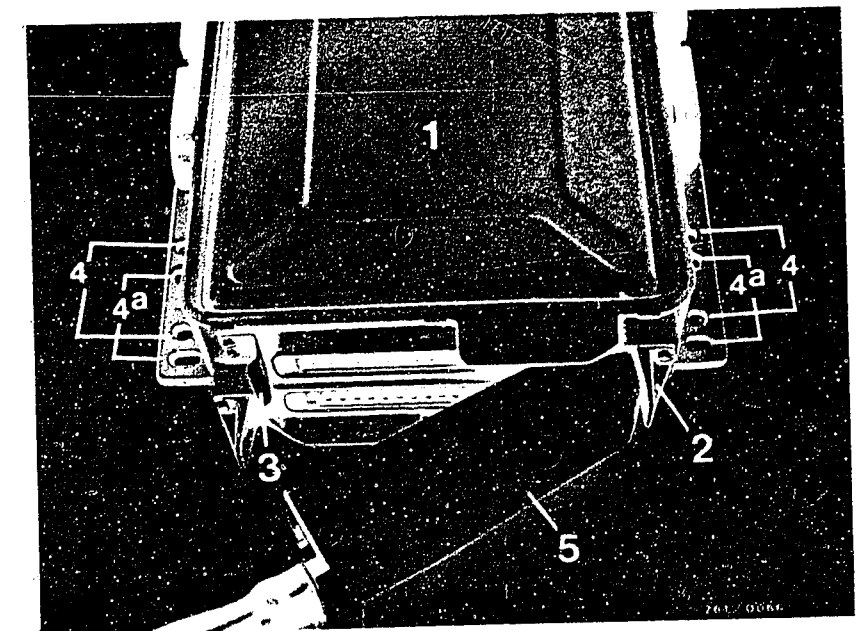
Trouble-shooting:

- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

F1

TEST STEP 33		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	13	On multimeter: <u>Less than 1 V</u>	<u>Component:</u> Control unit
<u>Program switch "N" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter		If reading O.K., continue testing with <u>next test</u> <u>step</u> .	<u>Operation:</u> Output stage for solenoid- operated valve MV1 Voltage between Term. 5 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			<u>Malfunction:</u> Voltage greater than 1 V
<u>Component: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.			



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.

F1

E9

Test with universal test adapter
Electronic transmission control BMW

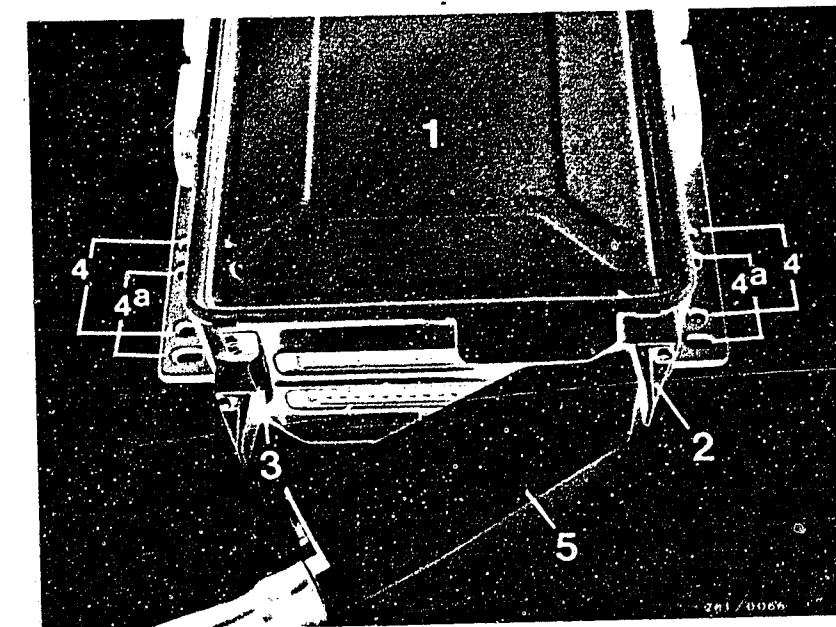


E10

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 34			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>	14	On multimeter: <u>Less than 1 V</u>	<u>Component:</u> Control unit
<u>Program switch "Ω" at position</u>	20		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Output stage for solenoid-operated valve MV2 Voltage between Term. 6 and Term. 22 (ground)
<u>Measuring range:</u> 15 V			
<u>Connection:</u> Test sockets (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Selector switch in position N, switch on ignition and let engine idle. Set program switch to position S. Follow sequence of operations.		If reading O.K., continue testing with <u>next test step.</u>	<u>Malfunction:</u> Voltage greater than 1 V



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

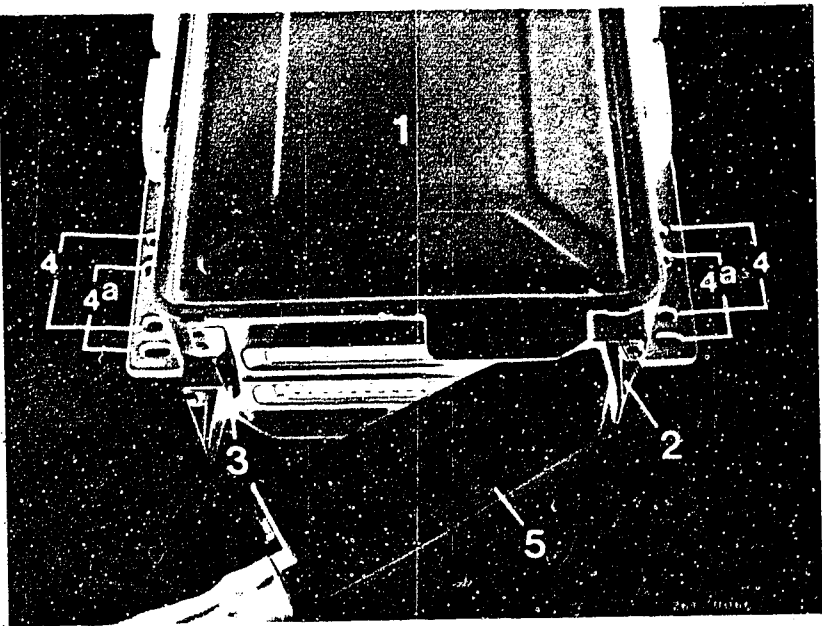
Trouble-shooting:

- Replace control unit.
- Check speed sensor signal with test steps 41 and 42, but operate engine only at idle speed with selector switch in position "N". There must be no pulses visible on the oscilloscope. Interference pulses must be eliminated.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder and the Motronic plug a green cable binder.



TEST STEP 35, test steps 35 to 42 to be performed on chassis dynamometer			
Operation:		Reading:	Testing:
<u>Program switch "V" at position</u>	15	On multimeter: <u>Less than 1 V</u>	<u>Component:</u> Control unit
<u>Program switch "Ω" at position</u>	20	<u>At approx. 20 km/h</u>	
<u>Measuring equipment:</u> Voltmeter		(Read off speed on chassis dynamometer)	<u>Operation:</u> Switching of output stage for solenoid-operated valve of reverse gear lock. Voltage between Term. 7 and Term. 22 to(ground)
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 20 km/h solenoid-operated valve switches.		If reading O.K., continue testing with <u>next test step</u> .	<u>Malfunction:</u> Voltage greater than 1V. Solenoid-operated valve does not switch at approx. 20 km/h.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Repeat test. Driving speed sufficient?
 - Replace control unit.
 - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

F1

E13

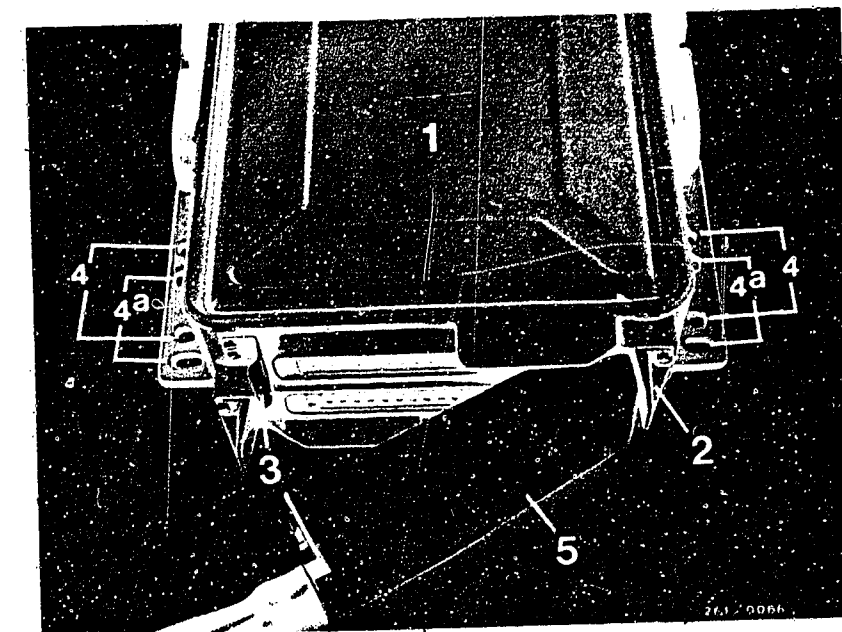
Test with universal test adapter
Electronic transmission control BMW

←→

E14

Test with universal test adapter
Electronic transmission control BMW

←→



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

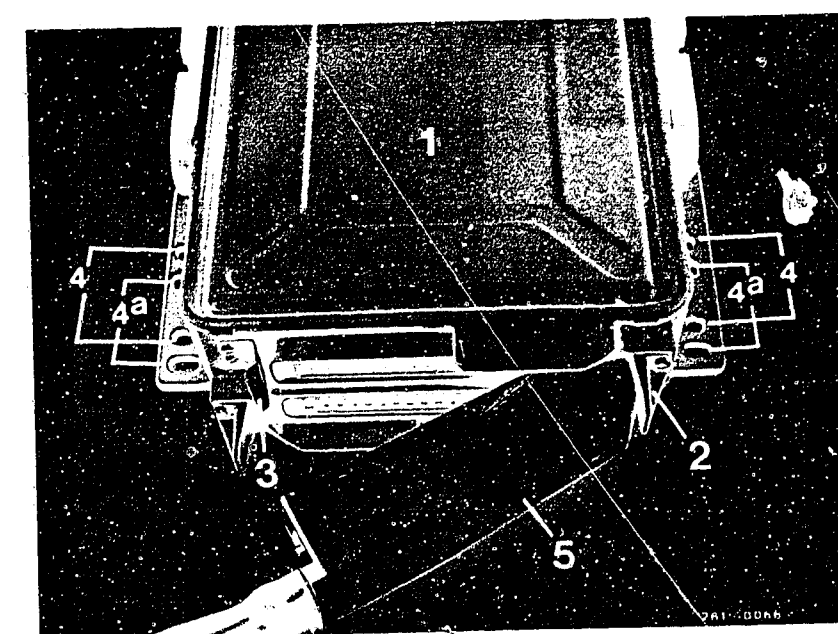
TEST STEP 36, vehicle on chassis dynamometer		Reading:	Testing:
<u>Operation:</u>			
Program switch "V" at position	16	On multimeter: 10 ... 15 V	<u>Component:</u> Control unit
Program switch "Ω" at position	20	At approx. 40 km/h	
<u>Measuring equipment:</u> Voltmeter		(Read off speed on chassis dynamometer).	<u>Operation:</u> Switching of output stage for solenoid-operated valve MV1. Voltage between Term. 5 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
Connection: Test sockets (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A)			<u>Malfunction:</u> Voltage less than 10 V; Solenoid-operated valve does not switch at approx. 40 km/h
<u>Operation in vehicle:</u> Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 40 km/h solenoid-operated valve switches.		If reading O.K., continue testing with <u>next test step</u> .	

Trouble-shooting:

- Repeat test. Driving speed sufficient?
 - Replace control unit.
 - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

F1

TEST STEP 37, Vehicle on chassis dynamometer		Reading:	Testing:
<u>Operation:</u>			
<u>Program switch "V" at position</u>	17	On multimeter: <u>10 ... 15 V</u>	<u>Component:</u> Control unit
<u>Program switch "Ω" at position</u>	20	At approx. <u>80 km/h</u>	
<u>Measuring equipment:</u> Voltmeter		(Read off speed on chassis dynamometer)	<u>Operation:</u> Switching of output stage for solenoid- operated valve MV2 Voltage between Term. 6 and Term. 22 (ground).
<u>Measuring range:</u> 15 V			
<u>Connection: Test sockets</u> (red = +, black = ground)	V		
Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).			
<u>Operation in vehicle:</u> Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 80 km/h solenoid-operated valve switches.		If reading O.K., continue testing with <u>next test</u> <u>step</u> .	<u>Malfunction:</u> Voltage less than 10 V. Solenoid-operated valve does not switch at approx. 80 km/h.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Repeat test. Driving speed sufficient?
 - Replace control unit.
 - Check speed sensor signal with test step 41 and 42.
- To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

F1

TEST STEP 38, vehicle on chassis dynamometer

Operation:

Program switch "V" at position 18

Program switch "Ω" at position 20

Measuring equipment:

Voltmeter

Measuring range:

15 V

Connection: Test sockets
(red = +, black = ground) V

Connect sockets 1 and 2 with a lead or with ammeter (1.5 A).

Operation in vehicle:

Switch on ignition and start engine. Program switch in position S. Selector switch in position D. Slowly increase driving speed without load; at approx. 100 km/h the converter clutch closes with 1 second delay.

Reading:

On multimeter:

Less than 1 V

At approx.
100 km/h

(Read off speed on chassis dynamometer)

Note:

To be able to read off the shift point correctly, the speed must be increased very slowly in the range around 90 km/h since converter clutch closes with 1 sec. delay.

If reading O.K., continue testing with next test step.

Testing:

Component:

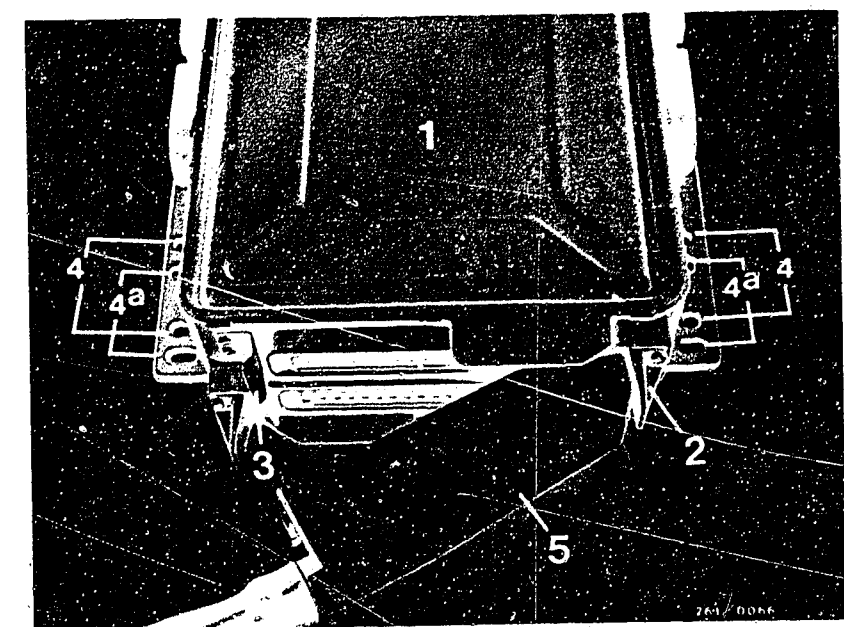
Control unit

Operation:

Switching of output stage for solenoid-operated valve of converter clutch. Voltage between Term. 17 and Term. 22 (ground).

Malfunction:

Voltage greater than 1 V; converter clutch not closing at approx. 100 km/h.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Drive up to the shift point once again very slowly.
- Replace control unit.
- Check speed sensor signal with test step 41 and 42. To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

F1

E19

Test with universal test adapter
Electronic transmission control BMW

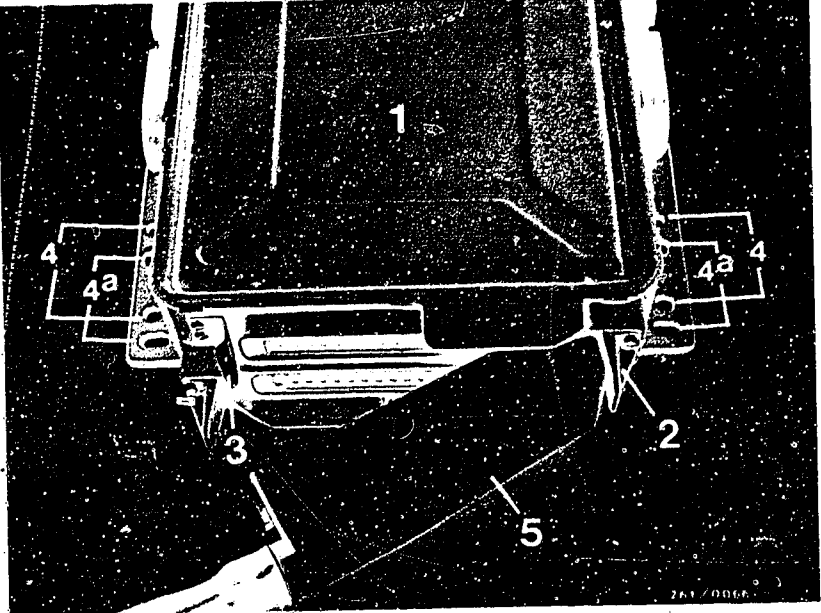


E20

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 39, vehicle on chassis dynamometer		
Operation:	Reading:	Testing:
Program switch "V" at position 18	On multimeter: 635 CSi, 732i, 735i: 950 ... 1050 mA; 745i: 930...1030 mA at idle	Component:
Program switch "Ω" at position 20		Control unit
Measuring equipment: Ammeter (remove any lead which may have been plugged in)		Operation: Current regulation for pressure regulator Measurement in lead to terminal 2.
Measuring range: 1.5 A d.c.		
Connection: Test sockets 1 and 2 (1 = negative, 2 = positive) Caution! Do not bring test sockets into contact with vehicle ground, e.g. by lead hanging down, otherwise control unit may be destroyed.	If reading O.K., continue testing with <u>next test step</u>	Malfunction:
Operation in vehicle: Let engine idle. Program switch in position S, Selector switch in position D.		Current reading outside tolerance



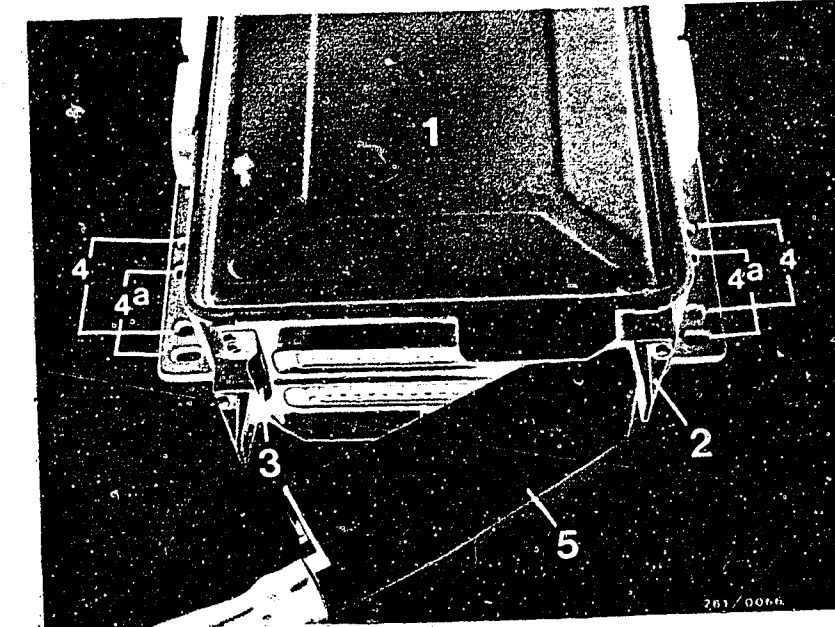
- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Replace control unit.

To prevent confusion between the two 35-pin plugs, in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

TEST STEP 40: Vehicle on chassis dynamometer			
Operation:		Reading:	Testing:
Program switch "V" at position		18	On multimeter: 635 CSi, 732i, 735i: 580...680 mA; 745i: 410...510 mA with button T1 pressed If reading O.K., continue testing with <u>next test</u> <u>step</u> .
Program switch "Q" at position		20	
Measuring equipment:			Component: Control unit Operation: Current regulation for pressure reg- ulator Measurement in lead to terminal 2
Ammeter			
Measuring range:			Malfunction: Current reading outside tolerance
1.5 A d.c.			
Connection: Test sockets 1 and 2 (1 = negative, 2 = positive) Caution! Do not bring test sockets into contact with vehicle ground, e.g. by lead hanging down, otherwise control unit may be destroyed.			
Press button	T1		
Operation in vehicle: Let engine idle. Program switch in position S, Selector switch in position D. Accelerate slightly until idle contact on throttle valve opens.			



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a= Mounting holes for 6 series
- 5 = Transmission plug

Trouble-shooting:

- Replace control unit.
- To prevent confusion between the two 35-pin plugs in addition to the mechanical latching method, the plugs have been differently marked. The transmission plug bears a yellow cable binder, and the Motronic plug a green cable binder.

E23

Test with universal test adapter
Electronic transmission control BMW



E24

Test with universal test adapter
Electronic transmission control BMW



TEST STEP 41, vehicle on chassis dynamometer

Operation:

Reading:

Testing:

Program switch "V" at position

2

Rotational-speed sensor signal (at 10 km/h) present (see bottom graph).

Component:

Speed sensor

Program switch "Ω" at position

20

Lever to left-hand stop (calibrated voltage range).

Operation:

Signal, Term. 8 to Term. 22

Measuring equipment:

Motortester, oscilloscope

Measuring range:

Special input

Connection:

Test wells; red clip to red well, black clip to black well

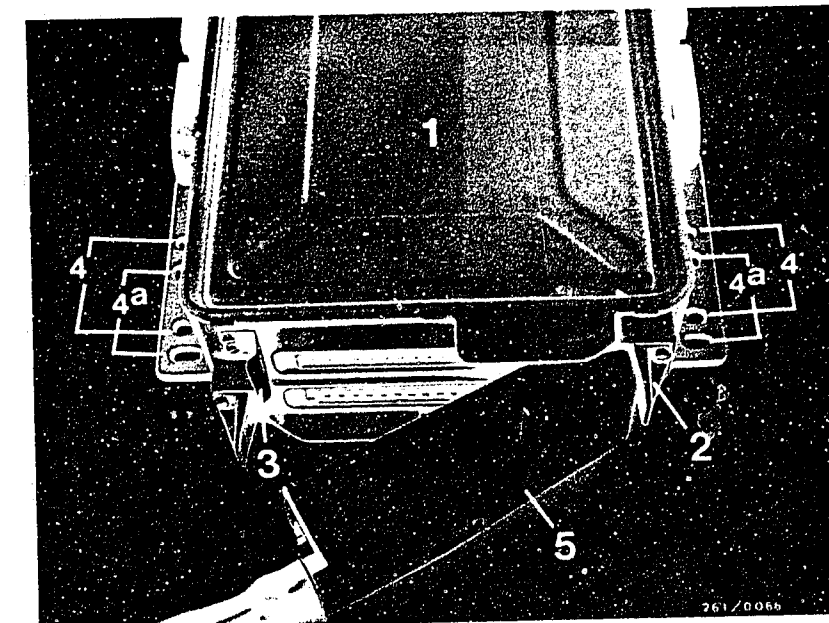
Operation in vehicle:

Selector switch in position D, program switch in position S. Set driving speed to 10 km/h (approx. idle).

If reading O.K., continue testing with next test step.

Malfunction:

Voltage less than 1.5 V; no signal.



1 = Control unit

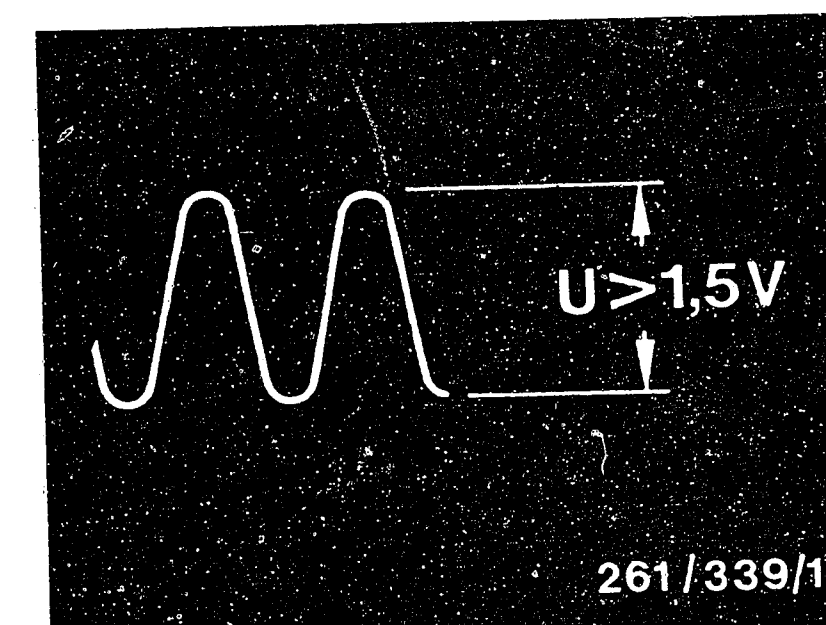
2 = Lug

3 = Detent

4 = Mounting holes for 7 series

4a = Mounting holes for 6 series

5 = Transmission plug



261/339/1

Trouble-shooting:

- Replace transmission.

F1

Test with universal test adapter
Electronic transmission control BMW



F2

Test with universal test adapter
Electronic transmission control BMW

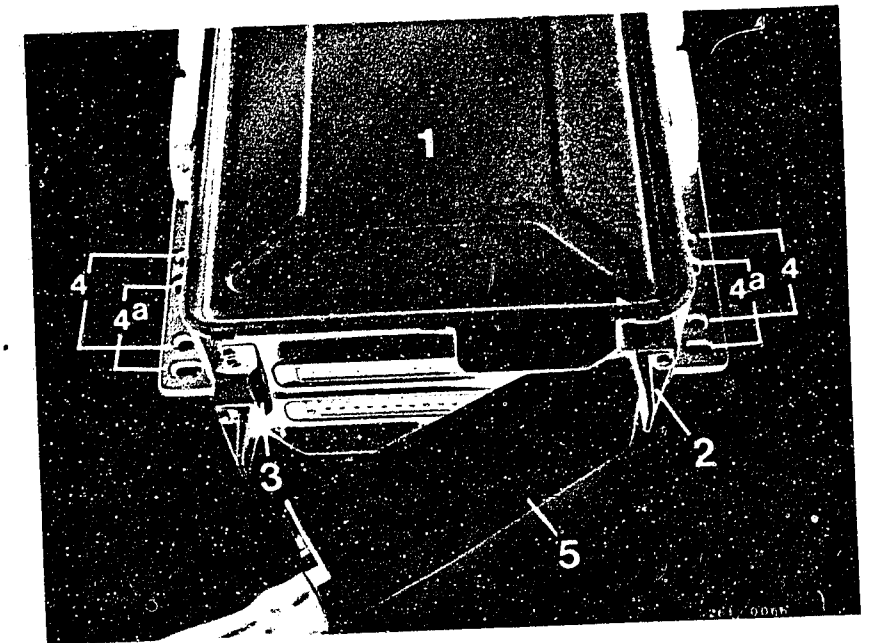


TEST STEP 42, vehicle on chassis dynamometer

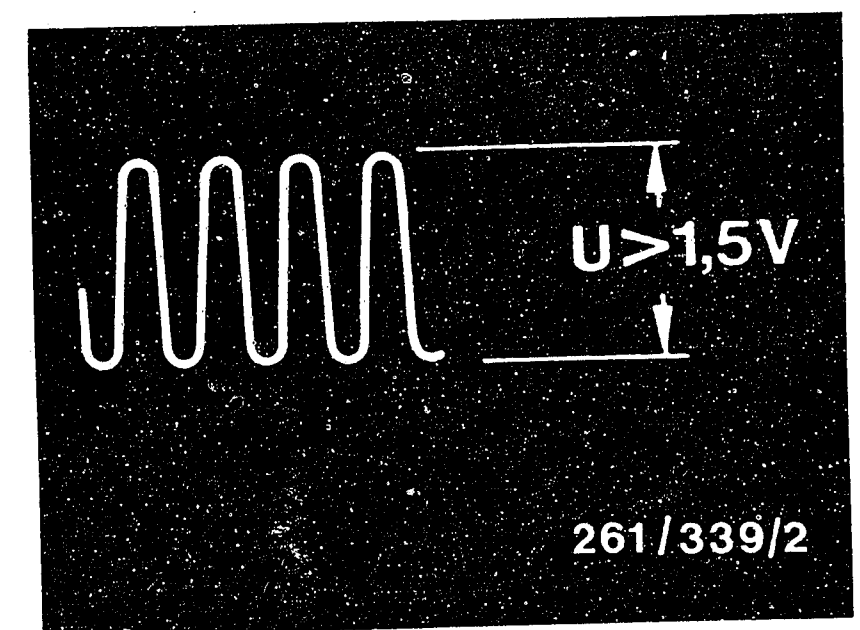
<u>Operation:</u>	<u>Reading:</u>	<u>Testing:</u>
<u>Program switch "V" at position</u> 2	Rotational-speed sensor signal (at 20 km/h) present (see bottom graph). Lever all the way to the left (calibrated voltage range)	<u>Component:</u> Speed sensor
<u>Program switch "Ω" at position</u> 20		
<u>Measuring equipment:</u> Motortester, oscilloscope		<u>Operation:</u> Signal, Term. 8 to Term. 22
<u>Measuring range:</u> Special input		
<u>Connection:</u> Test wells; red clip to red well, black clip to black well		
<u>Operation in vehicle:</u> Selector switch in position D, Program switch in position S. Set driving speed to 20 km/h.		<u>Malfunction:</u> Voltage less than 1.5 V

Trouble-shooting:

- Replace transmission.



- 1 = Control unit
- 2 = Lug
- 3 = Detent
- 4 = Mounting holes for 7 series
- 4a = Mounting holes for 6 series
- 5 = Transmission plug



Testing with the universal test adapter is now completed. If the fault has not been found, the Motronic and the knock control must be tested, if this has not already been done.

If Motronic and knock control are O.K., trouble-shooting must be continued in the transmission mechanism, hydraulic control unit, selector switch, program switch and selector lever.

F5

Test with universal test adapter
Electronic transmission control BMW



Table of contents

<u>Section</u>	<u>Coordinates</u>
Structure of microcard	A 1
1. Special features	A 2
2. Rapid diagnosis chart	A 2
3. Test specifications	A 13
4. Electrical terminal diagram	A 14
5. Installation position of components	A 18
6. Basic circuit diagram	A 19
7. Test equipment and tools	A 21
8. General information	A 22
9. Trouble-shooting	B 1
9.1 Important information	B 1
9.2 Operation of warning lamp for electronic transmission control	B 3
9.3 Trouble-shooting according to customer complaint	B 5
10. Test with universal test adapter	B 9



© 1986 Robert Bosch GmbH
Automotive Equipment - After-Sales Service
Department for Technical Publications KH/VDT,
Postfach 50, D-7000 Stuttgart 1

Published by: After-Sales Service Department for
Training and Technology (KH/VSK). Press date: 2.1986
Please direct questions and comments concerning the
contents to our authorized representative in your
country.

This publication is only for the use of the Bosch
After-Sales Service Organization, and may not be
passed on to third parties without our consent.

Microfilmed in the Federal Republic of Germany. Micro-
photographié en République Fédérale d'Allemagne.

